

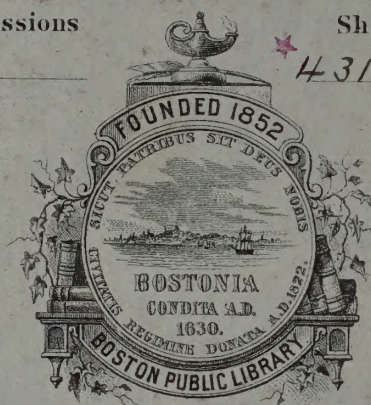
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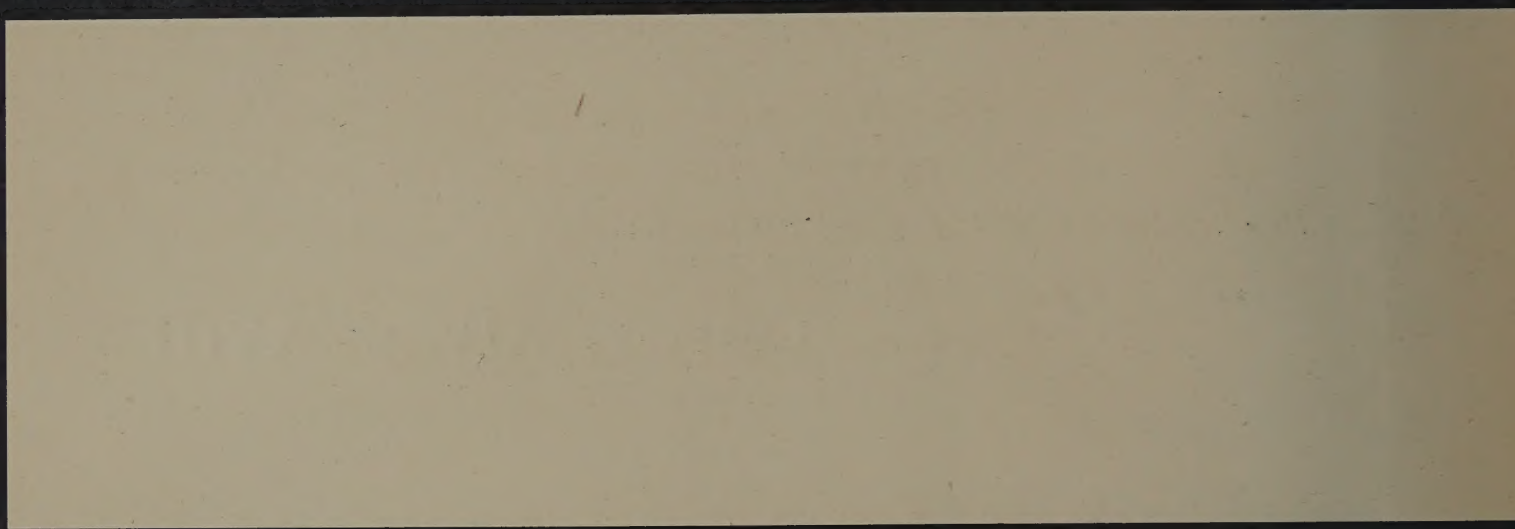
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Mar. 27, 1903

ARGENTINE-CHILIAN BOUNDARY

NOTE: This (the Second) Part contains—

CHAPTERS XIV. TO XVIII.



Argentine-Chilian Boundary



REPORT

PRESENTED TO THE TRIBUNAL APPOINTED BY HER BRITANNIC
MAJESTY'S GOVERNMENT "TO CONSIDER AND REPORT UPON
THE DIFFERENCES WHICH HAVE ARISEN WITH
REGARD TO THE FRONTIER BETWEEN THE
ARGENTINE AND CHILIAN REPUBLICS"

TO

JUSTIFY THE ARGENTINE CLAIMS FOR THE BOUNDARY
IN THE SUMMIT OF THE CORDILLERA DE
LOS ANDES, ACCORDING TO THE
TREATIES OF 1881 & 1893

*Printed in compliance with the request of the Tribunal,
dated December 21, 1899*

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CHAPTER XIV.

Summary—1. THE RECORD OF SEPTEMBER 22, 1898.

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1. THE RECORD OF SEPTEMBER 22, 1898.

THE Experts having been unable to draw up the final Record of their agreements and disagreements, and each of them having made a Report to his Government, the Argentine Government succeeded in obtaining from that of Chile the declaration that the Chilian Expert had refused to his Argentine colleague. In fact, the Minister for Foreign Affairs of Chile said that the Chilian Expert had communicated that his projected line is to be found within the Cordillera de los Andes, as ordered by the Treaties and in the form established by them.

In no case would the Argentine Republic have consented to submit to arbitration her sovereignty over territories belonging to her by inheritance from Spain; and it would be tantamount to doing this if the differences between the Experts were submitted to an arbitrator in the form the Chilian Expert pretended. The Chilian Expert tried to raise an abstract question, unforeseen by the Treaties, whereas there could only exist differences about the local placing of landmarks in the Cordillera. He tried to establish the question to be submitted to arbitration, thus:—*Is the Argentine-Chilian boundary the summit of the Cordillera de los Andes, or is it the continental divide?*

It was not possible to accept this, as the clear and conclusive wording of the Treaty of 1881 declares that the boundary between the two nations is the Cordillera de los Andes, from which it *shall not be removed in any case*, no matter what kind of questions might arise between the contracting countries. The Argentine Government, strong in their undeniable right, could not accept outside intervention for the purpose of discussing a principle already sanctioned by solemn Covenants. *Happily the differences were reduced to simple geographical points by the declaration in the Record of September 22, 1898, stating that the Chilean Expert had planned his line within the Cordillera de los Andes, as was stipulated by the Agreement of April 17, 1896.*

By the same Record, it is made known that the line of the Chilean Expert diverges from that of the Argentine Expert in the points and stretches marked by the former with numbers 1 to 9, and 1 and 2 by the latter; in those marked by the former with numbers 257 to 262, and 267 to 274 by the latter; in those marked with numbers 271 to 330 by the former, and 282 to 303 by the latter; in those marked with numbers 333 to 348 by the former, and with number 306 and the rest of the points without number that follow in the list of the latter.

In the same Record the Minister Plenipotentiary of the Argentine Republic in Chile stated that, "in the communication accompanying the antecedents relative to the general boundary line, the Argentine Expert affirms that the points and stretches marked by the Chilean Expert with numbers 1 to 9 inclusive, 278 to 330 inclusive, and 333 to 348 also inclusive, *are not situated in the Cordillera de los Andes, as ordered by the Treaties, and in the form which they establish.*" To this assertion the Chilean Minister for Foreign Affairs replied "that the Chilean Expert had communicated to his Government that the points and stretches just mentioned by the Argentine Minister *are situated in the Cordillera de los Andes, as ordered by the Treaties, and in the form which they establish.*"

The divergence appeared thus in the concrete terms foreseen by the Arbitration Agreement of 1896. The Experts had not agreed when fixing in the Cordillera de los Andes the boundary marks. It is true that the Chilean Expert had spoken of the hydrographical basins, of continental divide, of rivers which flow to the two oceans; but as it has been seen, the Government of his country made no allusion to any of these phrases when defining the question which the two countries submitted to arbitration. If such allusion had been made the Argentine Minister would not have accepted the controversy from a point of view which the Treaties did not permit. The Chilean Minister for

Foreign Affairs confined himself to upholding and sustaining the line of the Chilian Expert, because the latter assured him that it was located within the Cordillera de los Andes, as ordered by the Treaties, and in the form which they establish. In order to decide the difference, and to determine which of the two lines follows the highest crest of the Cordillera, the Umpires must study for themselves the geographical features. It was thus agreed in April 17, 1896, and also repeated in the Record of September 22, 1898, with the object of clearly setting down that the Treaties and Conventions had settled, once for all, the boundary between the two countries, and that there only remained the actual operation of placing the landmarks in the Cordillera de los Andes, as previously agreed. In the Record it is expressed as follows :—

“In view of the foregoing contradictory declarations which raise a question that only the Arbitrator can decide, and not having been able to arrive at any direct arrangement, the Minister for Foreign Affairs of Chile and the Envoy Extraordinary and Minister Plenipotentiary of the Argentine Republic agree, in the name of their respective Governments, to remit to that of Her Britannic Majesty a copy of the present Record, of the Records of the Experts which have been read, and of the Treaties and International Agreements in force, in order that, subject to Base 2 of the Agreement dated April 17, 1896, said Government may decide the divergences which have been recorded above.

“Finally, they agreed that the above-mentioned documents shall be delivered to the Government of Her Britannic Majesty by the Diplomatic Representatives of the Argentine Republic and of the Republic of Chile accredited to the said Government, who shall manifest to same that, the case foreseen in the above-quoted Base 2 of the Agreement of April 17, 1896, having arisen, they may proceed to appoint the Commission that is to verify the previous study of the ground, and solve all the divergences together and in one decision.”

Consequently, both Governments submitted to the Arbitration of Her Britannic Majesty's Government the geographical differences within the Cordillera de los Andes as soon as the Chilian Government accepted their Expert's word that the line he proposed was entirely within the Cordillera. Had it been decided to submit to arbitration a question of principle, as the Representative of Chile pretends, that question would have been especially mentioned, setting aside any other, so much so as its solution would have settled all the difficulties of delimitation, and it would not have been necessary for the Arbitrator to have made the preliminary survey of the ground.

Thus ended the discussion of the boundary line between Argentina and Chile. That part thereof on which the projects of both Experts coincided was recognised as the international frontier on October 1, 1898, when the Chilian

Expert said under his signature, that the points of that line are situated in the Cordillera de los Andes, in conformity with the conditions prescribed in the Treaties. That part of the boundary line on which the Experts did not agree has been submitted to the Arbitrator's decision in accordance with the terms of the Agreement of April 17, 1896. By the mere fact of presenting the Records to the Arbitrator, both Governments have signified that the moment has arrived for sending to the ground the Commission which is to survey it. Such a step implies, on the part of the Chilian Government, the acknowledgment that only geographical divergences are submitted to the Arbitrator.

2. THE BOUNDARY LINE OF THE ARGENTINE EXPERT ACCORDING TO CHILIAN OFFICIAL ACTS.

The Argentine Expert had, as a sure guide for fixing the true boundary, not only his own investigations and those of the Argentine Commissions, but also the reliable explanations given by three Governments, the Argentine, Chilian, and Bolivian, upon the very same boundary. These explanations have already been referred to in Chapter V., but it is considered useful to revert to some particulars relating thereto.

When the Argentine-Chilian Treaty of 1881 was framed, the boundary between the two countries was to commence in fact from parallel $26^{\circ} 52' 45''$ southward ; the rest northward as far as parallel 23° being an unsettled boundary between the Argentine Republic and Bolivia.

On March 10, 1893, * the ratifications of the Argentine-Bolivian Treaty were exchanged, in which it was clearly expressed that the "high crests of the Cordillera de los Andes" were to be the boundary between the Argentine Republic and Bolivia from parallel 23° down to the point whence the Argentine Chilian boundary was to be traced, that is to say, down to parallel $26^{\circ} 52' 45''$. The Chilian Government, who knew the clauses of this Treaty, entrusted Señor Bertrand with an investigation as to whether any of those clauses were opposed to Chilian interests. Señor Bertrand's Report is dated November 10, 1893, and the quotation to be made from it will show the Tribunal how Señor Bertrand, at that time, suggested the *continental divide* as boundary, though the line is to be found in the *Cordillera de los Andes*.

* The special attention of the Tribunal is called to all the mentioned dates, as they are most important in connection with the evidence presented.

Now, on March 10, 1893, the Treaty between the Argentine Republic and Bolivia determined the high crests of the Cordillera de los Andes as the boundary between the two nations ; on May 1, 1893, a Protocol was signed between the Argentine Republic and Chile, confirming the boundary in the "Cordillera" in the high crests ; on November 10, 1893, Señor Bertrand made his Report, introducing and suggesting the *continental divortium aquarum*, which was, at the same time, being sustained by the Chilian Expert, Señor Barros Arana. At this moment (November 10, 1893) the Argentine-Chilian Protocol of May 1, 1893, had not yet been ratified, and the Chilian Government, if they had accepted the views expressed by Señor Bertrand in his Report, and held by Señor Barros Arana, would certainly not have ratified it. But the Chilian Government did not act thus, and the Protocol of May 1, 1893, was ratified on December 21, 1893, after being sanctioned by the Congresses of both nations.

Had the Chilian Government considered the Argentine-Bolivian Treaty opposed to their interests, they would have followed Senor Bertrand's advice and asked for explanations ; but, on the contrary, by enforcing the Protocol, they acknowledged that they considered it explicit in its terms, and not opposed to the Chilian-Bolivian adjustments, since they knew that only in exceptional cases was the main chain of the Andes, which divides the waters that flow towards its two sides, "cut in several places by deep valleys which carry to one of the oceans the waters that have their source on the opposite slope" of the main chain.* This was recognised and foreseen by the same Protocol, which leaves on the Argentine side that part of the waters (rivers) which is found on the eastern slope of the main chain.

The Chilian Government therefore had not, until November 1893, upheld the theory of the continental divide, nor did they at that time give any preference to either of the following expressions, "watershed of the main chain," "high Cordillera," "line of the highest summits," since in their opinion they all had the same meaning.

The Agreement of 1884, signed with Bolivia for the temporary cessation of hostilities, being subsequent to the Argentine-Chilian Treaty of 1881, may be taken as a new proof that the Chilian Government had never the idea of the continental divide as a boundary line. In that Treaty there are only references to straight lines traced generally along high summits—lines which in that part corresponding to the *Cordillera de los Andes* follow this range near the line

* Documentos oficiales, etc., pp. 27, 28.

of high summits, the geographical position of which was not at that time well known.

The boundary between Bolivia and Chile from parallel $26^{\circ} 52' 45''$ as far as the parallel of lat. 24° S., was and always had been the Cordillera de los Andes, whose main points had been carefully marked out by Experts of the two countries. By the Treaty of March 10, 1893, Bolivia recognised as Argentine territory the zone comprised between the Cordillera Real and the Cordillera de los Andes, south of parallel 23° . The only interest that Chile had in this Treaty was that it changed one of her neighbours, and in consequence, when establishing her boundary with the Argentine Republic from $26^{\circ} 52' 45''$ to 24° she had to fix it along the same points of the Cordillera de los Andes which were previously determined when dealing with Bolivia. Northward of parallel 24° , as far as parallel 23° , the dividing line must be traced along the same Cordillera in its main chain, and the territories thus divided in this latter part belonged, on the eastern side, to the Argentine Republic, and on the western to Bolivia or to Chile. Bolivia was, in fact, the primitive owner of the land that stretches from the crest of the Cordillera to the shores of the Pacific on the north of parallel 24° , and owing to this, the Argentine Republic agreed with her upon the frontier line in that region, Chile militarily occupying the land on the Pacific shores on the north of the parallel 24° only as a consequence of the war of 1879.

The acknowledgment on behalf of Chile of the orographic boundary along the Cordillera through its most elevated crests, is clearly shown by the fact, already mentioned, that she had ratified the 1893 Protocol, being perfectly aware of the Argentine-Bolivian negotiations, and of the consequences which they would entail for the demarcation of the frontier.

Señor Bertrand, in his Report of November 1893, framed in compliance with orders he received from his Government, had said :—

“ But a *divortium aquarum* means a division between two waters or basins—these can only be the ocean basins and their tributaries ; but of which of the oceans are the numerous basins of the Puna, which is about 200 kilometres (124 statute miles) in width tributaries ? This is a question that has not been decided up to the present date (1893), notwithstanding the geographical investigations which have been carried out in that region.”

Notwithstanding this opinion, the Chilean Government continued to adhere to the definition of highest summits and *divortium aquarum* already given by the Minister for Foreign Affairs of Bolivia before the Assembly of that nation, when explaining the Bolivian-Chilian Treaty of 1874. He then said :—

"Mountain ranges culminate in summits which are their highest points, or in other places they rise in ridges, which are the angles formed at their crests by the opposite slopes, or else they run through the highest peaks or loftier crests. These peaks, these summits, these loftiest points, these highest angles constitute the *divortia aquarum* (or watershed), and geographically they are defined as part of the chain which separates the waters, either intermittent or continually flowing by slopes in opposite directions."

The Chilean Government agreed with this definition of the Bolivian Government, and declared that by the words Cordillera de los Andes in the *divortium aquarum*, they understood the most elevated crest and nothing else. Therefore, the Chilean Government, to be consistent with their own opinion, could not accept Señor Bertrand's explanation. Señor Bertrand, in fact, has two ways of interpreting the term *divortium aquarum*: in the case of an international boundary it means, for him, the continental water-parting, while in the case of internal lines within Chilean territory, it means a local watershed. Though this dual interpretation has been noted in page 237, further evidence may be derived from his note of June 21, 1884.* As has already been seen, according to the Chilean

* Señor Bertrand, in his communication to the Government of Chile, June 21, 1884, expresses himself in the following manner:—" . . . You will allow me first of all to define clearly the meaning of certain expressions which are of common occurrence in the Boundary Treaties, and which, without being synonymous, are tacitly considered to be so, whence has come more than one difficulty: such are the expressions '*divortia aquarum*,' the '*highest crests (cumbres)* of the Cordillera,' and the '*anti-linal line*.'

"The first of these expressions is incorporated in geographical technicality, and means a line of separation of the waters. It implies the previous notion that from the hydrographic point of view, a region is considered as divided into basins from the contour of each of which the waters flow to their lowest point or line. The contours of two contiguous basins, in the part in which they coincide, form the *divortia aquarum*, a line more or less winding, and determined by the features of the country. If these are such as form a mountain ridge, it seems natural that its summit or edge (fil) should be the *divortia aquarum*, and it appears also that in it should be found the loftiest crests (cumbres) of the mountain ridge. Certainly it is not always so, and especially does the geography of the Andes frequently contradict such conceptions. Its highest summits, as the 'cerro' of Aconcagua, the volcanoes of Descabezado, of Chilean and many others, rise, not on the central cordon but in outlying ranges (contrafuertes), piercing at some places into Chile, and at others into Argentina. Yet it happens that that cordon is cut in several places by deep valleys which carry to one of the oceans the waters that have their source on the opposite slope of the range. There are in these cases marked bendings of the *divortia aquarum*, which differs notably from the line of the high crests (cumbres).

"Another erroneous conception is that the Cordillera de los Andes only separates, in its whole extent, the waters which flow to the Atlantic from those which go to the Pacific, or that the rivers, torrents, gorges, which have their origin in the slopes of that Cordillera have necessarily made their way to one of the two oceans. There is one well-known exception to this rule: it is the basin of the Lakes Titicaca and Pampa Aullagas, a vast region hanging, so to speak, in the crest (cumbre) of the Andes, the lowest receptacle of which is the Marsh of Coipasa, 11,850 feet (3700 metres) above the sea.

"That which geography did not know, and which results from the recent explorations which I have completed, is that the high plateau which begins at lat. $14\frac{1}{2}^{\circ}$ S. is continued southwards till it passes the 27th degree of south latitude, and that the two Cordilleras, the eastern and the western, which enclose the high plateau, branch in this region into many cordons and independent masses which form valleys and rivers whose waters flow into many lakes and salt marshes (salares), without communication with one another. The expressions *divortia aquarum* and line of the crests (cumbres) have thus no precise meaning as applied

Government, the whole of that mountain chain has one watershed peculiar to itself, and therefore, in the Chilian-Bolivian and Chilian-Argentine Treaties, the *divortium aquarum* agreed on has the same meaning.

Had the Government of Chile held the same opinion expressed by Señor Bertrand in 1893, they would not, after the Report cited, have ratified the terms in which reference is made to the watershed to be found in the high crests, in the Protocol of 1893, knowing as they did that the Argentine-Chilian boundary must extend to zones where the difficulty pointed out by Señor Bertrand existed, viz. the finding of the *divortium aquarum* as he understood it. But the ratification of the Protocol of May 1, 1893, is not the only evidence of the affirmation made by the Chilian Government, that the boundary line was to follow in the north the highest crests of the Cordillera de los Andes ; there is to be found another proof in the Agreement of April 17, 1896.

No doubt is possible after reading this Agreement. In its first Article the Chilian Government declares that—

“The operations of the demarcation of the boundary between the Argentine Republic and the Republic of Chile which are being carried out conformably with the Treaty of 1881 and Protocol of 1893, shall extend in the *Cordillera de los Andes* as far as parallel 23° S., the boundary line between this parallel and that of 26° 52' 45" S. to be traced with the concurrence of both Governments in the operation, and of the Government of Bolivia, which shall be invited to that effect.”

The Chilian Government thus recognised the boundary agreed upon between the Argentine Republic and Bolivia, which is to run by the highest crests of the Cordillera de los Andes ; and not only did they recognise it, but they also invited the Bolivian Government, whose doctrines in the matter were well known, to take part in the tracing of the boundary.

Moreover, in ordering that the demarcating operations of the boundary

to the region under discussion. This application, however, has frequently been made, and I do not think it inopportune to establish as evidence the case to which I allude.”—Documentos oficiales, etc., p. 27 and following.

Señor Bertrand, as is clear from the foregoing paragraph, does not once refer to the interoceanic watershed. “*Divortium aquarum*,” according to Señor Bertrand, means the line of separation of the waters, that is to say, it may be the DIVORTIUM AQUARUM of a ridge of hills, of “cerros,” of a chain, or it may be the interoceanic watershed in the central ridge.

In June 1884, Señor Bertrand accepted a *divortium aquarum* in the Cordillera de los Andes, which was not the continental divide, as is inferred from the paragraphs quoted, and from his report on the Atacama Cordilleras in 1884 (see p. 71, footnote). In 1893 he, perhaps, set aside his dual interpretation, and no longer accepted any *divortium aquarum* except the continental one.

carried out in accordance with the Treaties of 1881 and 1893 were to be extended as far as parallel of lat. 23° S., the Chilian Government acknowledged that the entire boundary, i.e. the part settled by the said Treaties of 1881 and 1893, as well as that determined between the Argentine Republic and Bolivia, shall run along the "*highest crests of the Cordillera de los Andes*," which, according to the diplomatic language of the three nations, were clearly defined in the form which has already been stated.

3. OPINIONS OF RECLUS, SAN ROMAN AND STEFFEN FAVOURABLE TO THE ARGENTINE LINE.

"That which our respective countries have easily understood is not that the tops of the mounts should divide us, but that the lofty ridge of the Cordillera should naturally separate us, leaving the western valleys and waters for the Chilian, and the eastern valleys and waters for the Argentine." *

Thus does the Chilian geographer Señor San Roman, with great truth, express himself. This is what was always understood by the people of both countries, and what their Governments have agreed upon : the boundary on the heights of the main lofty ridge of the Cordillera ; and it is the rejection of this boundary by the Chilian Expert that led to the differences submitted to the arbitration of the British Government.

The explicit terms of the Treaty of 1881 signify that the sole intention of the negotiators was that the boundary should not abandon the Cordillera, and that the Experts should look within it for the summits forming the watershed peculiar to the high Cordillera.

It is unnecessary once more to repeat the opinions of the historians, geographers and statesmen on the subject : they all accepted the boundary imposed by Nature. But as the Representative of Chile has affirmed that there had predominated in the mind of the Argentine Expert the principle of the continental *divortium aquarum*, when planning a vast extent of the boundary, and that he has been inconsistent in not accepting it for the remainder of the dividing line, it is not out of place to state before the Tribunal, that the Argentine Expert has been consistent throughout, interpreting in his proceedings not only

* *Desierto y Cordilleras de Atacama*, by Francisco J. San Roman, Santiago, 1896, vol. 2, p. 641.

the views of the Argentine Government, but also those of the Chilian Government. The Chilian Expert maintained that the boundary agreed upon was the dividing line between the origins of the rivers which flow to the Pacific and to the Atlantic, and he contended that the words of Article 1 of the Treaty of 1881 refer to the sources of these rivers, ignoring altogether the snow-capped summits of the Cordillera. The acts of the Chilian Government themselves prove the error committed by the Expert, and now maintained in the Statement read by the Representative of the same Government.

The Conventions between the two countries determine as their common limit the "Cordillera de los Andes," establishing as the dividing line the most elevated crests which may divide the waters (Treaty of 1881), the main chain of the same Cordillera (Protocol of 1893). The Experts have differed, firstly as regards the location of certain landmarks in the main chain ; and secondly as to the lateral extension of the Cordillera de los Andes, since the Argentine Expert maintains that some points through which the frontier should run according to the Chilian Expert are out of the Cordillera, while the Chilian Expert on his part affirms that the said points are comprised within what he considers to be the Cordillera de los Andes.

It has been already mentioned what was, and naturally what is to be understood, not only by the Argentine Republic but also by Chile, as the "Cordillera de los Andes" ; the opinion of statesmen and men of science has been quoted, and it has been explained that the range of mountains that bears this name is perfectly delineated. On the west, and up to parallel of lat. 42° S., it terminates in the longitudinal central valley of Chile, which separates it from the eastern slope of the "Cordillera de la Costa," varying considerably in its width, as is stated by Darwin, Pissis, Domeyko, Barros Arana, etc., and also by the Chilian engineer Don Francisco J. San Roman, renowned by his explorations in north and central Chile, and in that part of the "Puna de Atacama" which was originally Bolivian and until lately claimed by Chile, but now declared to be Argentine territory.

According to the same authorities, to the south of parallel of lat. 42° S., the Chilian central valley sinks into the waters of the Pacific, leaving scarcely any trace of its continuation in that direction excepting a few small islands and the isthmus which unites the Peninsula of Taitao to Patagonia. The sea washes the slope of the Cordillera de los Andes till it cuts through it in the neighbourhood of lat. 52° S., whilst the "Cordillera de la Costa" is prolonged as a series of islands,

owing to its being intersected by many gulfs and channels. The distance between the two ranges is here about the same as in the northern and central regions.

On the Chilian side the slope of the "Cordillera" is well defined, and does not offer any difficulty. All the Chilian geographers determine it, and it is sufficient to say that everyone knows that the city of Santiago, the capital of Chile, is situated on the western side of the Cordillera. On the eastern side, the slope of the "Cordillera de los Andes" is also well defined; but as the Chilian Expert has proposed to place many landmarks at a long distance from the crest of the Cordillera and outside the Cordillera, it is there that are to be found the points upon which the differences of opinion have arisen between the Experts; and as those differences are to be decided by Her Britannic Majesty's Government it is necessary to point out some remarks which again confirm the fact that the Chilian Expert is completely alone in his conception of the boundary line and of the main chain of the Andes.

As the Representative of Chile has thought proper to support his views by quoting M. Elisée Reclus, the historian and geographer, whose authority is unquestionable, there are transcribed here a few of the opinions of this *savant* which have reference to the Argentine-Chilian boundary, and which strengthen, if possible, the line proposed by the Argentine Expert. M. Reclus says :—

"On the north-west of the Argentine Republic, the frontier claimed by Chile, or rather by the Chilians, *did not run along the principal chain of the Andes, but about 200 kilometres to the east*, upon the contour of a mountainous tableland of a greater extent than that of Belgium, or that of some other small countries. . . . The fact is that, in these Andean regions, the principal crest of the Cordillera has on one side of it the enormous base of the pasture plateau, upon which rise, here and there, peaks as high as itself, the bulk of which, under scanty snows, are intersected neither by ravines nor streams. Nevertheless, the line of volcanic summits, which unite from north to south Mount Licancaur with Mount Bravo, is sufficiently pronounced to mark with certainty the prolongation of the great Cordillera, and when seen from the west, this chain presents a very characteristic slope.

"From a geographic point of view, the division is already established, *and the Argentines are quite justified in claiming the boundary of the great chain.*

"To the south of the territory in dispute are high Andean lands, which are enveloped in a very dry atmosphere, only partially rendered less so by some humid currents of air; and these lands are split into several chains or ravines through the action of the rains which, during the lapse of centuries, have hollowed out amphitheatres and valleys in the mass of the rock.

"The continental backbone is plainly discernible in this part of America, where the disputed Argentine and Chilian frontier commences, and it is a fact that, in all times, the mountaineers of both slopes have known in a general manner *which is the true dividing crest*, and, at the same time, which is the highest source, amongst the beds of streams, nearly

always dry, which descend on one side towards the Pacific, and on the other towards the extensive Argentine plains.

"Nevertheless, the height of the plateaux in which are situated the peaks of the crest, disposed here without any apparent regularity, is so great, that the muleteers (*arrieros*) often have to journey for whole days at an enormous average altitude, exceeding 4000 metres (13,124 feet).

"Upon this base, which is slightly undulating, it would be difficult to mark with precision a boundary line, as the snow and mud fill the gorges and concavities, and even the simple depressions, without any marked slope and without any streams.

"On the other hand, the true line of the *divortia aquarum* must frequently vary in these heights, by reason of the *landslips*.

"When the action of the frosty air, the thaws, rains, snows and winds have affected a wall of rock, and it suddenly detaches, or gradually forms a rampart across the valley, the *pircas* which the caravans follow are interrupted, and, at the same time, the line of greatest heights becomes modified. . . .

"In fact the official text of the Treaty tells us that the boundary between the two countries must 'pass along the most elevated crests which may divide the waters along the line of slopes which descend on both sides of the principal chain of the Andes.' This is saying, in one sentence, two things which are quite conflicting.*

"The highest ridge from summit to summit and the point of the division of the waters may coincide, and generally they do; but this is not always the case, as all geographers know, and could bring forward evidence to prove.

"As an example, the Himalayas may be taken, the highest chain of mountains in the world, whose enormous bulwark, so far from forming the dividing line of the waters between India and Tibet, is completely involved in a network of rivers, viz. the Indus, the Sutlej, the Ganges and the Brahmaputra, which rise in the north of the chain, in the immediate vicinity of each other.

"Thus to the very sentence which was intended to establish the position between Argentina and Chile, several different constructions could be put; and war might have resulted from the treaty of peace.

"It is evident that the remedy is to be found by the side of the evil, for if the wording of the Treaty is incorrect, it is necessary to take its spirit.

"Having this in view, and considering the matter generally, it would be impossible to doubt for a moment that the object of the Treaty was simply to establish a boundary line, *which should coincide with the lofty ridge of the wall of separation*.

"This was understood when, twelve years after the conclusion of the Treaty, a supplementary Protocol was drawn up, according to which *it was agreed that the boundary could intersect the rivers in its course*; so that in no wise would the territory which was situated to the east of the Andes belong to Chile, and no portion situated to the west should belong to the Argentine Republic.

"Thus the compact appears absolutely clear and definite.

* The conflict presumed by M. Reclus had no real existence, as has been demonstrated by the Protocol of 1893, and has been afterwards recognised by the same geographer.

"On the other hand, with regard to the questions of detail, it is only natural to confide in the sense of justice and the judgment of the International Commission, and it is only reasonable to suppose that irregularities would be met with on both sides of the range.

"It is in the south of Chile properly so called, across the archipelagoes which border on the coast, that the principal difficulties arise, and here it is especially that the somewhat contradictory terms of the Treaty of 1881 require to be supplemented by those of the Protocol of 1893, assisted moreover by the excellent relations which are inspired by mutual good intentions.

"Four large rivers, the *Puelo*, the *Palena*, the *Ayssen* and the *Huemules*, with perhaps some other streams of water, certainly rise in the eastern valleys and plains, and it seems natural to assign them to Argentina, as indeed has been done by the Protocol of 1893.

"On the other hand, one, at least, of the Chilean Commissioners holds that the terms of the first Treaty permit him to still claim those rivers, so far as their sources in the high valleys, as they belong on the whole to the Pacific slope.

"According to the explorations of Hans Steffen, who was travelling on behalf of Chile, the *Puelo* rises in the *Cordon de los Castillos*, at fully 60 kilometres (37·28 statute miles) to the east of the *Andean Cordillera*, and gorges 60 metres high (197 feet) unite it with the Argentine plains; whilst the great separating chain, between the high bed of the *Puelo* and the Chilean slope, exceeds 1500 metres. Similar geographical features distinguish the valley of the *Palena*."

The commentary upon these quotations from Reclus by the distinguished Chilean geographer, Señor Francisco J. San Roman, is but one more confirmation of the Argentine Expert being in the right.

Señor San Roman comments thus on some of the passages of Reclus :—

"Agreeing with M. Reclus on the lack of precision in the wording of the International Treaty of 1881, we cannot be so certain as he is regarding the contradictions which are attributed to it, and which authorise him to declare that it was not possible to doubt for a moment that the object of the Treaty was simply to establish a boundary line which should coincide with the lofty ridge of the wall of separation.

"For, to say that 'far from taking the dividing line of the waters,' the Indians and Chinese were not divided by such a line, but by the lofty range, means to say that both the contiguous nations agreed to prefer the main chain of the Himalayas, and not the water-divide line, such as that proposed between the Argentines and Chileans.

"This is reasonably the case when dealing with the Himalayas, between India and China, but inapplicable to the Andes between Chile and Argentina, and M. Reclus would not have fallen into such an inconsistency had his judgment not been warped by the intrusive addition of the 'main chain' (*"encadenamiento principal"*) in the text of our Boundary Treaty as it was transmitted to the illustrious geographer.

"The Sampo runs through the gorge or valley behind the main chain of the Himalayas, between the latter and the chain dividing the waters, or the '*divortia aquarum*' between

Tibet and India, then turning suddenly to the south through the main range of the Himalayas, it discharges itself, as the Brahmaputra, into the Bay of Bengal, in the same way that the Palena runs through the valley behind the Cordillera de la Costa between this and the Andes which divide the waters between Chile and Argentina, and suddenly turning to the west, discharges itself into the Pacific." *

The immovable boundary between the Argentine Republic and Chile is the Cordillera de los Andes, not the continental water-divide, and thus it was settled in 1893. The Palena and other rivers have their sources outside the Cordillera, and M. Reclus is right when he states that the dividing line in the Cordillera is found in its main chain. As Señor San Roman, when referring to the Himalayas, gives to these words "main chain" the true meaning that they bear, the curious interpretation and application given to the same words by the Chilian Expert are deprived of all force by a geographer who cannot be charged with partiality towards the Argentine interest. The principal chain of the Himalayas, in the view of Señor San Roman, as well as in that of M. Reclus, is the principal central chain of the great range, as is the case with the main chain of the Andes, the loftiest chain where the snow never melts, the barrier which separates Chile from the Argentine Republic, as the Chilian Expert said until 1881—an unalterable barrier which he now seeks to abandon, in order to propose in its stead a line which must be subject to continual changes, and which is founded upon no scientific basis.

The boundary agreed upon by the Treaty of 1881 is the summit line of the Cordillera de los Andes, the watershed of its main chain, where the loftiest snowy peaks and huge glaciers form the great ridge, which geographical science and political agreements recognise as the line of separation between the two Republics. Never did it occur to either of the two peoples to neglect this great barrier in order to carry their frontier down to the regions where, generally speaking, in the low-lying border of the Patagonian tableland, is to be found the vague abnormal water-parting of the continent. It was the normal watershed of the high Cordillera that was stipulated.

The boundary agreed upon in the summit line of the Cordillera de los Andes cannot swerve from the Cordillera; as it could not swerve from the Himalayas, a boundary which would have to be determined along its summit line. For the purpose of fixing this frontier line, this range would never have

* San Roman, *op. cit.* vol. 2, p. 690, et seq.

been abandoned in order to search for the Asiatic continental divide in the Tibetan plateau, which is as entirely extraneous to the Himalayas as is, on a smaller scale, the Patagonian tableland to the Cordillera. In the same manner, if a line along the summit and in the watershed of the Cascade Range were under discussion as a frontier, it would be impossible to search for the continental divide in the Rocky Mountains, where it generally occurs, even though it were contended that this divide represents a more natural physical feature than that watershed.

If to the opinion of Señor San Roman is added that of Dr. Steffen, the able explorer of the Chilian Boundary Commission—an opinion completely contradictory, as to the main chain, to that of the Chilian Expert, Señor Barros Arana—the latter will be completely alone in his erroneous views. The main chain of the Andes, as considered by Dr. Steffen, is an orographical feature ; while, for Señor Barros Arana, it is formed principally by a certain number of abnormal divides south of 40°.

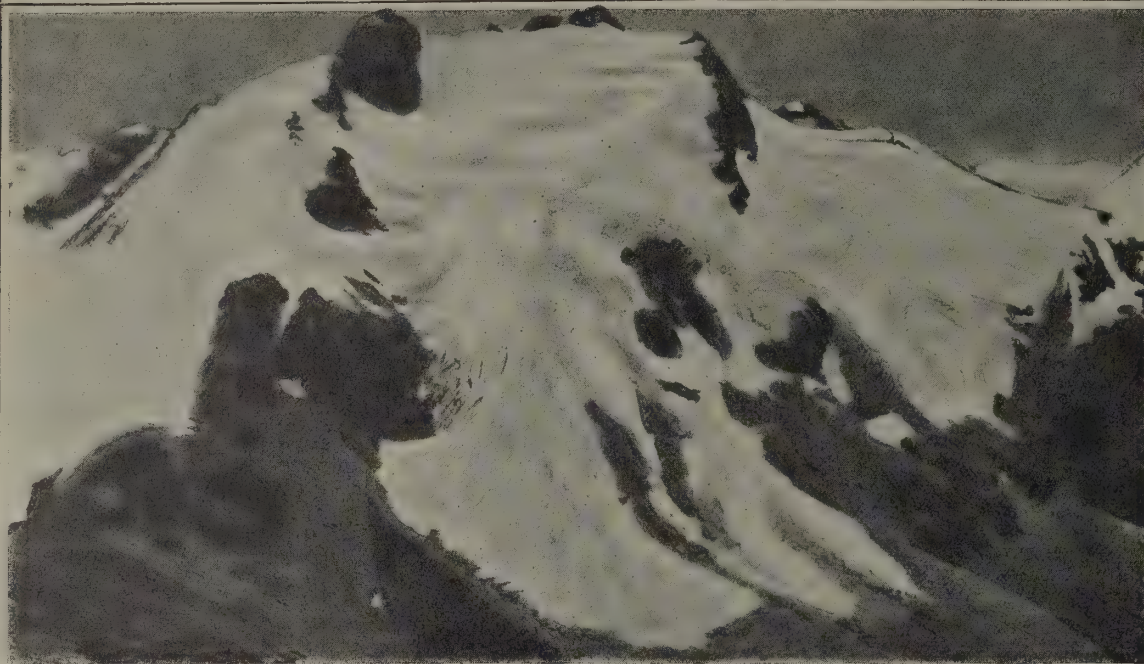
In his German Report on the exploration of the river Palena, Dr. Steffen * says :—

“The practical fixing of the political boundary line between the two Republics will, in the future, cause great difficulties, at this place as well as in the upper valley of the Carrileufú. No matter how much one may twist the interpretation of the expressions of the Boundary Treaty and its supplementary stipulations, which are not always clear, one fact remains certain, viz. that according to the letter and spirit of the Treaty of 1881, which retain their full force in the subsequent Protocol of 1893 (Article 1), the boundary line must follow the line of the highest crests dividing the waters, and consequently through the region of the eastern range surveyed by us, and which borders on the valley ‘16 de Octubre’ and the upper Carrileufú valley, on the east.

“According to this, Chile would have a rightful claim to the land of the inner valley, colonised for years by the Argentine Republic, and also to the valley ‘16 de Octubre,’ which is under the supervision of a resident police inspector.

“Unfortunately the new Boundary Protocol introduces, in its second Article, a fresh stipulation which is by no means calculated to facilitate the definite solution of any difficulties which might arise. It states that, according to the opinion of the two Governments, and to the spirit of the Boundary Treaty, the Argentine Republic retains her dominion over all the territory that extends to the east of the ‘main chain of the Andes’ down to the Atlantic coast, while Chile retains her dominion over all the land to the west, down to the Pacific Ocean. *In this Article nothing is mentioned as to the watershed line ; but instead of this the ‘main chain’ of the Cordilleras is substituted,* and the real meaning of this stipulation will

* Verhandlungen des Deutschen Wissenschaftlichen Vereins zu Santiago de Chile, 1895, Santiago, vol. 3, p. 54.



HELIO. IMP. DEL UNIVERSO

II. EL VENTISQUERO DEL CERRO DEL GALLO

(Segun fotografia original del autor)

MOUNT GALLO AND ITS GLACIER, IN THE MAIN CHAIN OF THE CORDILLERA DE LOS ANDES, ACCORDING TO DR. STEFFEN, AND CONSIDERED SO BY THE ARGENTINE EXPERT. (Reproduction of a Plate from Informe sumario acerca del trascurso y resultados generales de la expedicion exploradora del rio Cisnes, by Juan Steffen, Santiago, 1898.)

have, first of all, to be established. It is evident that this will give occasion for further discussions; for it will certainly not be generally granted that the 'main chain of the Andes' coincides with the ridge of crests dividing the waters. The decision of this matter is entirely one of individual appreciation, and *no geographer of to-day will think of basing his plan of a mountain system solely upon that of a hydrographical map.* If one were to consider the eastern range, which forms the watershed, as the main chain in the Palena Cordillera, it might be permissible, although the largest mountain masses are in the central and western parts; however, *no objection can be raised to the conception which regards as the main chain the imposing central snow chain, which though, as before mentioned, is full of deep gaps, and intersected by rivers, nevertheless distinctly presents the series of highest crests.* We are eagerly looking forward to the decision in this complicated case of the Commissions of the two countries appointed to mark out the boundary line."

There is a great difference between the main chain, which "presents the series of highest crests," thus called by Dr. Steffen, and the main chain of Señor Barros Arana, formed by "swamps," "plains" and "bends of rivers."



HELIO. IMP. DEL UNIVERSO

V. REGION DE LOS ORÍGENES DEL RIO CISNES

(Segun fotografia orijinal del autor)

REGION OF THE ORIGIN OF THE RIVER CISNES, OR FRIAS, IN THE MAIN CHAIN OF THE CORDILLERA DE LOS ANDES, AS CONSIDERED BY THE CHILIAN EXPERT. (Reproduction of a Plate from Informe sumario acerca del trascurso y resultados generales de la expedicion exploradora del rio Cisnes, by Juan Steffen, Santiago, 1898.)

Both interpretations are herewith shown on two Plates taken from one of Dr. Steffen's latest publications. *

The first represents "Mount Gallo and its glacier," whose crest pertains to the main chain of the Andes, considered as such both by Dr. Steffen and the Argentine Expert; and the second represents the "Region of the origin of the river Cisnes (or Frias)," a river which cuts through the Cordillera by a deep gap at the foot of Mount Gallo (lat. $44^{\circ} 50'$ S.). This region is considered by the Chilean Expert as the *main chain of the Andes*, according to the interpretation he gave to these words in the Record of January 1, 1894.

* Informe sumario acerca del trascurso y resultados generales de la expedicion exploradora del rio Cisnes, by Juan Steffen, Santiago, 1898.

4. THE ARGENTINE EXPERT HAS NOT ENTIRELY FOLLOWED THE CONTINENTAL WATER-PARTING IN TRACING HIS LINE IN THE SECTIONS IN WHICH THE BOUNDARY HAS BEEN DEFINITELY FIXED.

The Experts were simply demarcators; they were to carry out the directions of the Treaties according to their scientific knowledge, and, in case of disagreement, the differences that could not be settled by the Governments were to be decided by an Arbitrator.

The Experts, carrying out their engagements, presented respectively plans for a frontier line, and both plans coincided over a considerable extent of the Cordillera de los Andes, as they both conformed, in this part, to the conditions stipulated in the Treaties.

The length of the line to be marked out in 1898 was divided into three sections; the first comprised the zone between parallels 23° and $26^{\circ} 52' 45''$ S. lat.; the second, between this parallel and the region nearing parallel 52° S.; and the third referred to the coast of the channels in the vicinity of the latter parallel. In another chapter a comparison will be made of the differences between the lines proposed by both Experts, but it may be well to show here: (1) the error into which the Chilean Representative has fallen in informing the Tribunal that the part of the line situated in the Cordillera de los Andes agreed to by the two Experts in the Record of *October 1, 1898, follows the principle of the division of the waters*; (2) how the Argentine Expert has considered the main chain of the Andes; (3) why, in the latitude of Mount Copahue, he turns his line away from the main chain in the case of the bifurcation of the Cordillera at this point. All this requires to be explained.

The Argentine Expert has not followed "the principle of the division of the waters" in the accepted part of the line. That is far from being the case, for if this principle had been followed out by both Experts the line would have been agreed upon in its entirety. The best proof that the Argentine Expert did not accept the views of his colleague on this point is to be found, therefore, in the well-grounded differences which arose.

The Chilean Representative said before the Tribunal that—

"The water-parting line is the best topographical feature which a mountain or a Cordillera can offer for the fixing of boundaries. Besides being the most clear and the

easiest of perception, it combines other advantages, which it is not possible to ignore. If the water-parting line does not run always precisely over the highest parts of the mountains, and if, in consequence of the irregular and capricious nature of these, it cannot run over the peaks and gigantic summits which rise here and there on the lateral flanks of a chain, it is evident that this line (the water-parting) maintains always in its course an average height more uniform, and that in any case it never descends to the deep valleys which the rivers have excavated in descending from the heights to find an outlet to the lower land."

This is perfectly right as regards the watershed of the true Cordillera in its main chain, but not as to the water-parting line of the continent, outside the Cordillera. Should this be the true meaning of the sentence, the Chilean Representative would have only repeated the views of the Argentine Government, the heirs of the Spaniards to the 'eastern slope' of the Cordillera de los Andes. The negotiators of the Conventions and the Argentine Experts have always had in view the soundness of this topographical boundary, when interpreted in its proper sense, both in framing these Conventions and in carrying them out. The Argentine Expert did not project his line by causing it to pass from one high peak to another, without proper investigation of the continuity of the range. *Such a thing has not occurred in a single case.* In tracing the Argentine line, the same procedure has been followed out as, in analogous cases, in other countries which are separated by chains of mountains.

The Chilean Representative, on submitting to the Tribunal his comparative list of heights, tries to show that the Argentine Expert has only planned his line according to the continental divide, and that the summits or peaks of the Cordillera, of greater height than the boundary line, have not been taken into consideration by him. The fact of his not having accepted these isolated peaks as points of the frontier, does not indicate that the Argentine Expert has not taken them into consideration, but that, in his opinion, if the boundary had followed the line of the said high peaks, the necessary conditions, as ordered by the Treaties, would not have been fulfilled.

The Argentine Expert has maintained that the frontier shall run along the main chain of the Andes, which combines the greatest height of the Cordillera with the division of the greatest volume of water, and he has planned his line according to this principle. He knows that there does not exist in Nature any range of mountains of great extent that is not, in some places, crossed by a stream or river, and he knows also that the Cordillera is cut by "majestic and narrow defiles"—as ascertained by the Chilean Expert—which give passage to

the waters of the opposite slope. According to the Chilian Representative, the Chilian Expert, when deciding upon the definitely traced portion of the frontier, stated that the division of the waters was born in mind; that this was the manner in which the stipulations of the Boundary Treaty were carried out; and that such was the interpretation which in the practical application had been given to the words, "*main chain of the Cordillera.*" The Argentine Expert does not object to these conclusions if they are correctly interpreted, because it is true that in the high ridge of the central chain of the Andes, as considered by Señor Barros Arana, i.e. the main chain, along *the whole extent in which the frontier line has been agreed upon*—with the exception of the part comprised between Mount Copahue and the Santa Maria Pass—*occurs the division of the waters of the continent, as well as the division of the waters of the Andean Cordillera*, properly so called, in its main chain; but it is likewise a fact that the Argentine Expert *has not taken any account of the continental water-parting*, as that is not stipulated in the Treaties, *but has taken into account the watershed of the main chain of the Andean Cordillera, because it is this that was stipulated*, in order to define the high frontier ridge in this chain.

The limit agreed upon between Mount Tres Cruces and Mount Perihueico, with the exception mentioned, follows the *great crest* of the Andes, which coincides with the *watershed* of the main chain.*

* The landmarks have not always been fixed in the exact points of the division of waters. It frequently happens that the gaps are filled up with snow, and it has been, and always will be, impossible to determine the exact position of those points. The Chilian Expert has pretended that the Treaties direct that the line should pass between the sources of the rivers, but it is well known that in the Cordillera the sources of the rivers are often found tens of miles away from the principal ridge of the main chain, and nevertheless it is in the latter that the landmarks have been placed, at the intersection of their two "vertientes" or slopes, so that an orographical limit has been fixed. The difficulty of fixing the boundary at the exact division of the waters is shown in the rejected project of Instructions for demarcation which the Chilian Expert presented to the Argentine Expert in December, 1893. Yet, in practice, difficulties have arisen. Up to this moment, even though the Experts have agreed to accept the "Maipu Pass" as a point of the frontier, they have not agreed as to the spot where the landmark should be placed. Upon the lava at the foot of the volcano Maipu, the dividing line of the waters is continually changing through the action of the snow and the wind. The proposal of the Argentine Expert to place the mark in the prolongation of a line drawn from the summit of the Maipu volcano to the eastern summit of the Mount Bayo would avoid the difficulty, but it has not yet been accepted. If there is that uncertainty in the watershed of a mountain at a point which is about 13,000 feet high in the centre of the mountains, what will not exist in a division of the waters such as the Chilian Expert proposes in the southern regions, on the Patagonian plains, and in the hollows of the transversal valleys? But, in the opinion of the Chilian Expert, Señor Barros Arana, that uncertainty was not worthy of notice, and the water-divide must always be considered as an immovable line.

5. THE MAIN CHAIN OF THE ANDES ACCORDING TO THE ARGENTINE EXPERT.

When Señor Moreno proposed the general boundary line to his colleague, he gave, as already seen, his definition of the line according to the wording and meaning of the Treaties (Record of September 1, 1898). He said :—

“1. That the general line which he proposes to his colleague is wholly comprised within the Cordillera de los Andes.

“2. That in its entire extent it passes between the slopes which descend one side and the other of the main range.

“3. That he considers that said main range is constituted by the predominating edge of the principal and central chain of the Andes, considered to be such by the first geographers of the world.

“4. That this principal chain is the most elevated, the most continued, with most uniform general direction, and its flanks shed the larger volume of waters, thus presenting the conditions established both by the Treaty of July 23, 1881, and by the Protocol of May 1, 1893, to constitute, with the crest line of its slopes, the general frontier line between the Argentine Republic and the Republic of Chile.”

It has been clearly demonstrated that the traditional boundary is the snowy ridge of the Cordillera, the ideal white edge-line which the Chilian villages have before them in close proximity on the eastern side, and which from the flat Argentine Pampa appears serrated like a colossal saw. The very defiles, more frequented now by traffic than previously, produce that impression of the intersection of two inclined planes at an enormous altitude, which impression the laborious ascent and descent through the steep gaps confirm.

If, in reality, there does not exist a mathematical line as the crest of this intersection, there nevertheless exists a general mass, higher in the centre than on its sides, along its whole extent cut here and there by narrow and deep longitudinal valleys and by gaps giving passage to its waters, and which can more or less easily be traversed by man. For the Argentine Expert, the whole of the mountain range, bounded by prolonged wide valleys and by ridges pertaining to other independent chains, is the Cordillera de los Andes of the Treaties ; its central mass, loftier and more continuous, forming the general culminating line or “the principal chain of the Andes.” At the time of the negotiation of the Treaty of 1881, it was generally believed that the waters which arose within the Cordillera, had their sources in the culminating line “where the

snow never melts," in the central chain, in that ideal main chain ; and thus in deciding that the dividing wall between the two countries was the snowy summit of the Cordillera, it was deemed that this principle would be better defined by saying, that the boundary should run along the line of the loftiest summits that may divide the waters of the Cordillera de los Andes. The idea of a general division of waters at the Cordillera's summit was at no time altered by the knowledge which was being obtained respecting the existence of rivers crossing those summits from east to west through deep gaps, through which flow the eastern slope's waters, and even some of those of the Argentine level plains.

Nature does not present her features with mathematical precision, but nevertheless, the difference between the theoretical conception and the actual facts is not so wide as to render them antagonistic, and therefore to prevent the tracing of the frontier in the manner provided by the Treaty. The Cordillera de los Andes, throughout the whole length separating the two countries, is continuous in its immensity. Within it exists the central mass, generally impracticable, and its passage is barely feasible through some narrow defiles or water-gaps, which do not break the continuity of the chains which constitute that Cordillera. Within it exists the principal chain of the Andes, the high "Cordon central de la Cordillera" of the Chilian geographers ; and although that "cordon" is not the only one dividing the waters of the Cordillera (since there is no rule without exceptions), it is therein the main division of those waters. Within it exists the boundary according to tradition as well as the Treaties, uniting the most considerable general altitude and the greatest volume of water flowing from the crest.

Nature cannot be compelled to modify her work to suit human interpretation : it is the duty of man to find the means to make his interests harmonize with the conditions of the physical features from which he deduces them ; and this has been done by the Argentine Expert in planning the Argentine boundary. He has not sought in any case to carry the line over the highest points of the Cordillera, without at the same time taking into account the ridge dividing their waters. He has studied the principal mass, bearing in mind that generally it branches out into two ridges which unite and separate from each other, but always keeping a uniform general direction. He has found that in general, the Andean Cordillera is composed of various lines of ridges whose bearings are more or less parallel ; ridges which sometimes must be taken to belong to the western or to the eastern chain, taking as a separation between both the most

pronounced general longitudinal depressions produced by tectonic forces, volcanic action and by the effects of erosion and denudation.

Moreover, the Argentine Expert has not claimed to find for the boundary in the Cordillera a single absolutely continuous ridge. He has considered the mountainous mass in general, choosing therein the main chain, as best adapted to the letter and the spirit of the Treaty ; and *has been enabled to find the natural line sought for, as well as the political line as understood by the statesmen of the two countries*, when looking for the true natural boundary following the crest of the range which divides the greatest volume of waters of the main chain of the Andes, according to the opinions of geographers and historians. As has been stated, it has not been based upon the existence of one single crest dividing the waters of the Cordillera, because the words of the Protocol of 1893, fixing the boundary in the principal chain of the Andes, supposes several chains to exist.

The main chain of the Andes, according to the Argentine Expert, does not admit the erroneous idea, that there is only one ridge of mountains. His personal experience has shown him that a single crest does not exist in the Cordillera. The main chain of the Andes *is the central ridge of the Andes*, such as it was defined by Señor Barros Arana before acting as the Chilian Expert ; it is the culminating line of the Andes on "the high peaks on which the snow never melts" ; it is that "*constituting always a barrier between Chile and the Argentine Republic, which is only broken by narrow and majestic defiles.*" *

The very nature of the mountainous mass indicates the boundary : therein exist the natural lines of the utmost significance, which unite in themselves the necessary conditions ; and the principles to be adopted for drawing the boundary are indicated by the very outline of the Cordillera. Such a line as the one defined by the Chilian Expert does not exist there. On the other hand, that proposed by the Argentine Expert is perfectly consistent with the orography and hydrography, constituting a natural boundary which is the best which can be traced in such a region, considered from the point from which it must be viewed, and having regard to the general advantage of the two countries which it separates.

Señor Bertrand, technical adviser of the Chilian Expert, has stated in his Estudio Técnico :—

* *Geografía física*, Santiago, edition 1871, p. 298 ; edition 1874, p. 321. The words "*between Chile and the Argentine Republic*" are suppressed in the editions of 1881, p. 364, and 1888, p. 366.

"The Chilian and Argentine nations have always considered themselves separated by a natural boundary, *i.e.* the summits of the Andes, and for many centuries there has been neither occasion nor necessity to analyse the geographical importance of this expression. . . . The formula proposed by Chile, "the most elevated crests which may divide the waters," appeared to indicate a general coincidence between the summits of the mountains and the *divortium aquarum*. It is interesting to take notice that the Argentine Minister, Señor Bernardo de Yrigoyen, was the first to correct the omission of the locating formula, and thus removed all uncertainty in case of conflict between the orographic elevations and the hydrographic demarcation, by means of adding the words, '*and it shall pass between the slopes which descend one side and the other,*' which had already been accepted by both Governments, in the Preliminaries for settlement in 1877 and 1878, upon which the definite Agreements were drawn up. . . .

"So many and so indisputable are the advantages of a natural frontier over conventional ones that there is no instance of the latter having been preferred, except for definite reasons, principally connected with the population (ethnological or political causes), and the absence or ignorance of natural features (geographical causes).

"In the first case, the frontier is *political* (Belgium and Holland); in the second it is *geographical* (Canada and United States). . . . When these reasons are not at stake, and when the frontier zone contains *natural features*, and *when it is not inhabited*, and there are no fundamental interests concerned in it, the selection of a *natural boundary line* is prescribed." *

* It will be advisable here to make some observations on the opinions of Señor Alejandro Bertrand, as he has been charged by the Chilian Representative to give evidence before the Tribunal. Señor Bertrand, treating of "Natural and Conventional Frontiers," has said in his *Estudio Técnico*:—"The frontiers of nations are of two great classes, *Natural* and *Conventional*. Among the first appear the coasts, or shores, or seas, the lakes and rivers, the course of these latter, the summits of ranges. Boundaries of this kind, by their very nature, lend themselves to be defined by a single expression or phrase, *the crest of the Pyrenees*, the shore of the Mediterranean, etc. It suffices to indicate the two extremes of a natural frontier for this to be defined in its whole extent. This implies the feature of continuity characteristic of these lines."

The chain of the Pyrenees which, as Señor Bertrand says, is a natural boundary, is cut by water at no less than six places, without mentioning the Republic of Andorra. Since the chain of the Pyrenees, crossed by several rivers, deserves the name of natural frontier, the same description may and must be applied to the Cordillera de los Andes, also cut by the waters flowing down from the eastern slope, and from the plains commencing at the river Huahum.

Señor Bertrand continues:—"Although for natural frontier lines it suffices to determine their extreme points, their *precise situation on the ground*, especially with reference to international frontiers, is only definitely determined by general or special agreements, owing to the fact that in nature there are really no actual lines, but zones of a varying breadth. Thus, the *shore* of the sea oscillates between high and low tide; that of a *river*, between floods and droughts; the ridge of a range is in many places flattened in the form of a tableland, or presents prominences whose most visible crests do not coincide with the summit proper. For the situation of the frontier line, in such cases, to be considered as perfectly fixed, it is necessary to have regard to general agreements (or technical definitions) universally adopted, as to what is understood by beach, shore, course, summit, etc., and when these are not sufficient it is necessary to have recourse to special agreements which should state the delimitation within the course of the rivers or of the summit of the mountains, in order to assign jurisdiction to the lagoons that may be found amongst the latter, or to the islands that may obstruct the former."

If there are really no lines, but zones, in nature, out of which to form national boundaries, it is astonishing that Señor Bertrand should recommend the water-parting as the best boundary, seeing that it

The natural boundary prescribed by the Treaties which determine the

presents features so contradictory to the conception of a continuous line suitable for a boundary, existing as it does to the south of 40°. It will be impossible for Señor Bertrand to demonstrate that the line which he now recommends has been adopted in one single instance; far less, therefore, that it has been of universal adoption.

He continues:—"So many and so indisputable are the advantages of natural frontiers over conventional ones, that there is no instance of the latter having been preferred except for definite reasons, principally connected with the population (ethnological or political causes), and the absence or ignorance of natural features (geographical causes)."

On the Austro-Roumanian boundary there has been adopted, as a frontier, a line passing over the highest summits of the Transylvanian Alps which divide the waters of these Alps, although the same ethnic element (the Roumanians) is to be found on the north and south sides of the chain, and the northern basin joins the southern by means of the Aluta. In this case the importance of the orographic barrier has imposed itself so evidently that neither ethnic considerations, nor the fact of the basin of the Upper Aluta subsequently belonging to the Kingdom of Roumania have prevented its selection as an international boundary.

Referring to boundary lines, Señor Bertrand says:—"The most difficult *geographical* line to mark out is the straight line uniting two distant or inaccessible summits over irregular ground, as would be, for example, that which has been stated as a solution, according to the *theory of the highest summits*, between Mount Aconcagua and the greatest of the summits of the Ramada. Along the 65 kilometres (40 statute miles) that separate the two summits, there are many parts from which neither of them can be seen, and a most expensive triangulation, over almost impracticable ground, would be necessary to obtain the fixing of the line between them, which would be, after all, most unnatural and unsuitable as a dividing boundary."

The demarcation, in the main range of the Andes, for tracing the boundary between lat. 23° and 26° 52' 45" S. is—according to the true interpretation of the theory of the highest summits or crests, as maintained by the Argentine Expert, that is to say, a regular one—the one claimed by the Argentine Republic, and not a capricious line, as that suggested by Señor Bertrand would be. The work of the delimitation demonstrates that there is no difficulty in tracing a frontier line along the high summits of a range. Señor Bertrand appears to think the Cordillera uniform throughout its whole extent from north to south. The two peaks mentioned are visible from every height, and his words respecting Aconcagua and Ramada are only applicable to the deep gorges.

Following he adds:—"Not to seek examples outside cases analogous to our own, we may quote the Treaty made on December 2, 1856, between France and Spain, Article 8 of which says, 'From this point to Chapitelcoarria, situated on the right bank of the Bidassoa, and a little further below Andarlasa, the frontier shall follow *almost entirely the line which separates the slopes down which the water flows* (1), on one side towards the five cities of Navarre, and on the other towards Saint Jean de Luz.' . . . One of the most eminent of savants, the geographer of the most world-wide reputation among those of the present day, M. Elisée Reclus, goes so far as to call a *violation of natural boundaries*, the disregard, by political conventions, of the natural frontier of the hydrographic basins, as may be seen by the following examples of the Pyrenean and Alpine frontiers.

"Among the masses of granite which form the skeleton of the eastern chain, and those round which are deposited the formations of the western chain, there opens a wide geological passage where some mountains, all belonging to the transition period, ramify. This intermediary zone is the true centre of the Pyrenees. The Val d'Aran, which occupies the greater part of it, is wholly French *by the drainage of its waters*, as well as by the language and customs of the inhabitants; it is only Spanish by its passes for communication and by *political conventions* (2). . . .

"All the high valleys of the Tessin, and even some of those whose waters flow into the Adda, have become Helvetic land; the *high basin* of the Adige as far as the width of the Lake of Garda, belongs politically to Austria; the same is the case with the Upper Brenta. The only two Alpine rivers on the southern slope whose waters run almost entirely through Italian soil are the Piave and the Tagliamento.

"On account of this *violation of natural boundaries* numbers of mountains with glacier-covered summits, although geographically situated to the south of the central chain of the Alps, nevertheless rise either in

(1) The words "almost entirely" totally destroy Señor Bertrand's arguments.

(2) Reclus, *Geog. Univ.*, vol. 2, p. 80.

Argentine-Chilian frontier is quite clear: it is the principal ridge of the Cordillera

Austria or on the frontier. Some of the loftiest of these in Central Europe are the Orteler, Marmolata, the Cimon della Pala, with vertical steepness not less imposing than those of Cervin." (3)

With regard to these remarks, it is to be noted that in the first place they do not apply to the Cordillera de los Andes. Then again, Señor Bertrand confines himself to quoting some isolated cases, and takes great care not to mention the important ones in which mountain chains as political boundaries cut through the course of the rivers, without in the least violating natural laws.

M. Reclus says, in his *Geog. Univ.*, vol. 3, Central Europe, p. 289:—"Hungary appears in the centre of the continent in the form of a regular oval of low lands surrounded by a girdle of mountains." He then says that the middle of this country is *very clearly delimited*, and, referring to the Alps of Transylvania, he adds: "The main chain, bent towards the south, sinks from summit to summit, but has not yet lost its characteristics as a great mountain range at the spot where the Danube, *formerly imprisoned by the continuous rampart of the Carpathians and by the Servian Mountains*, has escaped by the gap of the Iron Gates. . . . Finally, to the west of the great mountain of Paring, another tributary river of the Danube, formed by the Sil Magyare and the Sil Valaque, *although also flowing through Hungarian territory, crosses the chain of the Transylvanian Alps*, but through a gorge so wild, a cleft so narrow and difficult, that to get from one slope to the other, the inhabitants carefully avoid the defile and pass to the west by the high pass of the Vulcan, a mountain which notwithstanding its name has nothing volcanic about it." Reclus also states that the mountains of Western Transylvania are divided *by the rivers into several distinct groups*, and that *the Sil, the Aluta and the Bodza of Transylvania pass to the Danube direct by the openings in the mountains*.

But some of the expressions of the eminent geographer which Señor Bertrand quotes so complacently, are very much open to discussion, because if the principle it appears to involve were strictly applied, whole nations would be wiped off the map of the world. In fact, if in virtue of the principle of natural frontiers (employed by Señor Bertrand) the Upper Tessin is Italian because it belongs to the Italian basin of the Po, in the same way the Upper Rhône and Upper Rhine must be respectively French and German, since they belong—the former to a French basin in its lower part, and the lower course of the latter to a German basin. What would remain of Switzerland in this case? Nothing more than a geometrical point on the summit of the St. Gothard. Señor Bertrand omitted to speak of the chains of the Erzgebirge, of Transylvania, etc.? In referring to those mountain ranges crossed by rivers, Reclus never employs the expression "*violation of natural frontiers*"; and proofs of this are to be found in his opinions on the Argentine-Chilian boundary, quoted in this chapter.

Señor Bertrand also says in his work, p. 9:—"When a merely conventional boundary is agreed upon, great minuteness, as we have said, is observed as regards the enumeration of its points, especially in the case of regions densely populated, where the references to roads, buildings, etc. are clear and without ambiguity." P. 10. "But the same is not the case in little-explored countries, where natural lines of great extent have been agreed upon as boundaries."

Then it is necessary to make a previous study of the practical form in which the lines agreed upon can be carried out on the ground. In a word, it is necessary to interpret the general definitions of the Treaty, having regard to the special forms assumed by the ground in the boundary zone. From this study or interpretation will be derived the rules for delimitation which are to constitute the Instructions to the Members of the Commission.

The Treaty of 1881 settled that the "Cordillera de los Andes" was the frontier between the Argentine Republic and Chile; and the features mainly characterising the boundary were to be noted down when surveying the range. But it has been stated that the Chilian Expert, relying upon the opinions of Señor Bertrand in 1890, refused as unnecessary these preliminary investigations which are always made before the tracing of a frontier.

This voluntary ignoring of the continuous physical conditions of the Cordillera has caused all the differences which have arisen over this delimitation, from 1890 until 1898. "The rules of delimitation," put forward by the Chilian Expert and his adviser, rest upon no basis whatever, being in flagrant contradiction to the natural features of the boundary agreed upon.

In another chapter, *à propos of delimitation of the frontier*, Señor Bertrand states:—"A distinction is to be

(3) Reclus, *Geog. Univ.*, 1887, vol. 1, pp. 336 and 339.

which extends in the central or main chain of the same, and that which ever formed a *barrier between Chile and the Argentine Republic*;* it is the crest of the Andes according to Señor Bertrand.

The Chilian Expert, writing as a geographer, when no question had arisen as to the intersecting of the Cordillera de los Andes, referring to the indigenous races

made between delimitation on the ground and geographical delimitation. Delimitation on the ground consists in placing landmarks or signposts that indicate in an actual manner the demarcation at certain fixed points. . . . The geographical delimitation is the tracing of the frontier line upon a map. When a Boundary Treaty is entered into between two Powers whose territories are carefully mapped out, the delimitation clauses are accompanied by the detailed plan upon which the frontier line has been marked."

This curious distinction has no basis whatever. Delimitation on the ground demands a previous knowledge of the country in which the frontier line is to be traced. This is a rudimentary principle. Delimitation is a geographical operation, whereas Señor Bertrand's theory reduces the task of the Experts to that of an ordinary mechanic.

Mr. M. Baker, in his paper (4) on the Alaskan Boundary, states that:—"All boundary questions are, from their very nature, geographic in character, and no purely geographic matter or question of the slightest complexity can be clearly stated, explained, or understood without maps. If you would know where a boundary is, or what it is, draw it on a map. By so doing its bearings and relations become clear at once."

The Treaty of 1881 was signed under special circumstances. At that time it was impossible to draw a satisfactory map of the Cordillera de los Andes, but the general rule governing the boundary was a clear one. The map would be indispensable when the time should arrive for tracing the line on the ground. However, the Argentine Experts having demanded that these maps should be prepared, the Chilian Expert and his technical advisers refused to accept their proposals, thus complicating operations *perfectly* easy in themselves.

Señor Bertrand insists upon the importance of the *continental dividing line*, which, he says, "is, nevertheless, generally acknowledged by geographers. It can be frequently seen mentioned in the publications relating to the map of the territories of the United States, under the name of 'Continental Divide' (U.S. Geographical Report upon the Survey West of the 100th Meridian, 1889)." That is true, but the continental divide has never been used as a political boundary when there is a neighbouring mountain range which may serve as such.

The fact of mentioning it does not imply that the U.S. Geographical Survey recommends it as a boundary. In the Report referred to, amongst other subjects dealt with are the mountain chains that cross the territory of the United States. The fact is, that in the fifty States and Territories forming the United States, on only one occasion has the *continental divide* been employed in a section of a boundary between two States, and that is between Idaho and Montana, but it must be observed that the *divide* coincides in the part in question with an important mountain chain. In all the other cases the frontiers are conventional.

According to Señor Bertrand, "any map of the Alps, Pyrenees, Himalayas, or Andes may be examined, and it will be seen that the most regularly formed chains are broken up, deviate and bifurcate; certain branches predominate by their mass, others by their height, whilst others keep the general direction, etc. To sum up, the *orographic lines* are characterised by their discontinuity, in the same way that the hydrographic are characterised by their continuity."

The said chains are really broken, and, therefore, the political boundaries cross the rivers which traverse them; this fact destroys Señor Bertrand's arguments. In the map of the world the *orographic lines* have always been preferred to the hydrographic.

"Whilst, under certain circumstances, the courses of streams are unstable, under other conditions, streams maintain their course with great pertinacity; of this, water-gaps and canyons across mountain ranges are striking results." This note of Mr. Garnett, quoted by Señor Bertrand, goes entirely against the affirmations of the latter respecting the immutability of terrestrial hydrography.

* Barros Arana, *Geografía física*, 1871 p. 321.

(4) The Alaskan Boundary, by M. Baker, Journal of the American Geographical Society of New York, vol. 28, New York, 1896.

of the extremity of South America, mentions the Moluches who dwelt on "both slopes of the Cordillera, and on the land which lies to the west of the Andes as far as the sea, that is to say, all the territory of Chile.*

The same Señor Barros Arana, in his *Historia General de Chile*, has given a general idea of the orographic configuration of the Chilian territory. He refers to it as the long and narrow strip of territory which, in the southern portion of South America, extends on the western side of the Cordillera de los Andes. Speaking in the same book of the mountain chains which run through the country, he says :—

"One of these chains, composed of rugged mountains, steep defiles, declivities and mountain sides streaked with stratifications of divers colours, of numerous volcanic cones some of which are in eruption to this day, of angular outlines and inaccessible summits that lose themselves in the region of perpetual snows, is the huge and massive Cordillera de los Andes which rears itself up on the east, and traverses the whole of South America."

When treating on the meteorology of Chile, he adds :—

"The bulky and steep Cordillera de los Andes, stretching from north to south like a gigantic wall, is a formidable barrier to the movements of the atmosphere in the eastward regions." †

* Barros Arana, *Geografia fisica*, 1871, p. 328.

† *Historia general de Chile*, por Diego Barros Arana, Santiago, 1889, vol. 1, pp. 29–31.

P. 29.—"1. *General idea of the orographic configuration of the Chilian territory.*—The long and narrow strip of territory which, in the southern portion of South America, extends on the western side of the Cordillera de los Andes, presents peculiar features regarding its structure and suitability for the habitation of man. In the course of its length of over 500 leagues in an almost straight line, it touches the tropical region on the north, and its southern extremity reaches latitudes whose temperature approximates to that of countries near the circumpolar zone. Contrary to that which occurs over the greater part of the earth, where tropical countries exhibit the most luxuriant and varied vegetation and the most abundant agricultural crops, the Chilian soil commences by arid and waterless deserts, barren to all cultivation and apparently uninhabitable; and in its prolongation towards the south it gradually changes its aspects and conditions, and attains the greatest degree of humidity and of animal and vegetable life towards its centre, which again begins to decrease on approaching the colder climates of the higher latitudes.

"This curious phenomenon in climatology, which has exercised a great influence upon the distribution and development of the population, finds its natural cause in the structure and surface aspect of the Chilian soil. Two chains of mountains, running parallel to one another from north to south, constitute the basis of its orography. One of these chains, composed of rugged mountains, steep defiles, declivities and mountain sides streaked with stratifications of divers colours, of numerous volcanic cones, some in eruption to this day, of angular outlines and inaccessible summits that lose themselves in the region of eternal snows, is the huge and massive Cordillera de los Andes, which rears itself on the east and traverses the whole of South America. The other chain, composed of low, rounded, flat-topped, granitic hills ("cerros") and of which the summits resemble the waves of the sea calming down after a storm, runs on the west.

"In the northern region, the connection of these last named mountains is not constant, and its dispersed and disordered masses are frequently joined on to the spurs which start from the Cordillera de los Andes. In the central portion of the territory, the continuity of the said chain becomes more pronounced, and is only interrupted to give passage to the rivers that flow down from the great Cordillera. Further south, nevertheless, this same western chain is cut by the ocean; and only its highest peaks appear on the surface of the waters in the

In the point where the first difference in the south part of the boundary arose, the western part of the Andes commences in the rugged Cordillera de Ipela (40° S. lat.), at the crest forming the principal continuous ridge of the main chain of the Andes; and the slopes of the chain, to which the Treaty of 1881 refers, are the declivities of the same.

By thus considering the geographical features, the spirit of the Covenants is thoroughly respected. It has been already said that the two Governments interested, in order to remove some difficulties, established that the line should be drawn along the main chain of the Andes, so that the Argentine Republic should retain her dominion and sovereignty over all the territory that extends to the east of the ridge of this main chain, and the Republic of Chile over that which lies to the west.

The Chilian Statement read before the Tribunal expounds the general rules which the Chilian Expert sought to lay down; but it is to be observed that they are *not* applicable because the ground does not permit it, nor are those rules applicable which the Chilian Expert erroneously attributes to the Argentine Expert. The only rule which is applicable is that which is imposed by the nature of the ground, and it is this which the Argentine Expert has applied in accordance with the letter and the spirit of the Treaty of 1881, and of the Protocol of 1893.

It has been shown that the Argentine Expert has followed the orographic

form of archipelagoes of hundreds of large and small islands which by their position preserve a parallelism with the lofty mountains that rise in the east.

“Between these two chains runs a longitudinal valley, of which the configuration and accidental features are determined by the orographic system which we have just described.

“In the north, this valley is interrupted by the spurs that spring from the Andes to unite themselves with the mountains of the coast. In the centre, the valley spreads almost without obstacle, widening or narrowing according to the greater or lesser thickness of the mountains enclosing it. In the south, the waters of the ocean, that interrupt the continuity of the chain of the coast by converting into islands its highest peaks, fill up the basin of the central valley, making it into a channel lying intermediate between the said archipelagoes and the slopes of the great Cordillera.

“The slow but incessant action of geological forces, that unceasingly transform the contours and surfaces of continents, will doubtless, within longer or shorter time, complete the upheaval of that region. The archipelagoes will become the visible continuation of the chain of mountains of the coast, and the channels that now separate those islands from the continent will be the natural prolongation of the longitudinal valley.

“2. *Influence of this configuration upon its Meteorology and Products.*—This conformation of the Chilian territory exercises a direct and immediate influence upon its climate and upon its meteorology. *The bulky and steep Cordillera de los Andes, stretching from north to south like a gigantic wall, is a formidable barrier to the movements of the atmosphere in the eastward regions.* The easterly winds, which, in the countries bordering on the tropics, carry with them humidity and rains, find themselves kept back by this barrier, and discharge their waters upon the other side of the Andes.

“This is the cause of rain being almost unknown in the lowest latitudes of Chile; and there, where, according to the general laws that govern climatology, an abundant vegetation should be seen, are only to be found deserts, useless for any agricultural cultivation.”

principle in tracing the line between parallels 27° and 40° S. lat., and that the acceptance of that line by both Experts is a mere coincidence, since each of them has been guided by different criteria.

From the summit of Mount Tecar, near to parallel 23° S. lat., southwards the Argentine line has followed the dividing line of the two slopes of the Andean Cordillera, a line which, owing to its always having a high ridge, forms the main chain of the Cordillera, the traditional limit. This line not only answered to the conditions required by the Treaties, but likewise to those indispensable for the international frontier: general difficulty of access, facility for guarding such passes that exist, and leaving a distance between the line of separation and the inhabited centres of each country, so as to avoid frictions, the distance tending to neutralise the effect of the usual disputes that may arise between nationalities and interests. Throughout the world are often found questions between peoples and races arising out of the lack of a boundary which fulfils the above conditions, and not a few upheavals in international relations have been produced by the clashing of paltry interests between peoples on the frontier.

To draw a line satisfying these conditions within the letter and the spirit of the Treaties, has been the purpose of the Argentine Expert.

The line planned by the Chilian Expert in this part of the boundary was drawn through the same points, and so has been accepted *because it is situated in the main chain of the Cordillera de los Andes.*

At all the points wherein the line dividing the waters has coincided with the Cordillera, properly so called, in its general line of lofty summits, even though some few still loftier rear themselves to the right and left, it is these points that have been chosen by the Argentine Expert for tracing the political line of separation. But where the *divortium aquarum* does not coincide with the said Cordillera, as the boundary between the two countries is the *Cordillera de los Andes*, and not the *water-divide*, the line must be marked out along the mountain range. The case of the boundary between Argentina and Chile in the Cordillera de los Andes is similar to that between Transylvania and Roumania in the Carpathians. In the latter the frontier passes along places where the orographic and hydrographic lines coincide. There, when a lateral and isolated summit is to be found, this summit is not taken into account, and the line following the crest of the range which contains the general mass of summits is chosen as the boundary, as it combines the local conditions necessary for a good frontier. There also, when, for instance, the river Aluta, flowing from the north (as in

Mount Aconcagua
(7130 m.; 23,393 f.)



MORADO GAP (5070 m.; 16,636 f.), FACING TO THE N.N.E. TOWARDS MOUNT ACONCAGUA.
Argentine landmark No. 129.

Mount Tupungato
(6830 m.; 22,408 f.)
Landmark 133

Bravard Volcano
(5980 m.; 19,619 f.)
Landmark 134



MORADO GAP (5070 m.; 16,636 f.), FACING TOWARDS MOUNT TUPUNGATO AND BRAVARD VOLCANO.
Argentine landmark No. 129.



LAS PIRCAS GAP (4898 m.; 16,076 f.).
Argentine landmark No. 128.

Mount Aconcagua
(7130 m.; 23,393 f.)



QUEBRADA HONDA GAP (4293 m.; 14,085 f.), SHOWING MOUNT ACONCAGUA TO THE E.S.E.
Argentine landmark No. 115.

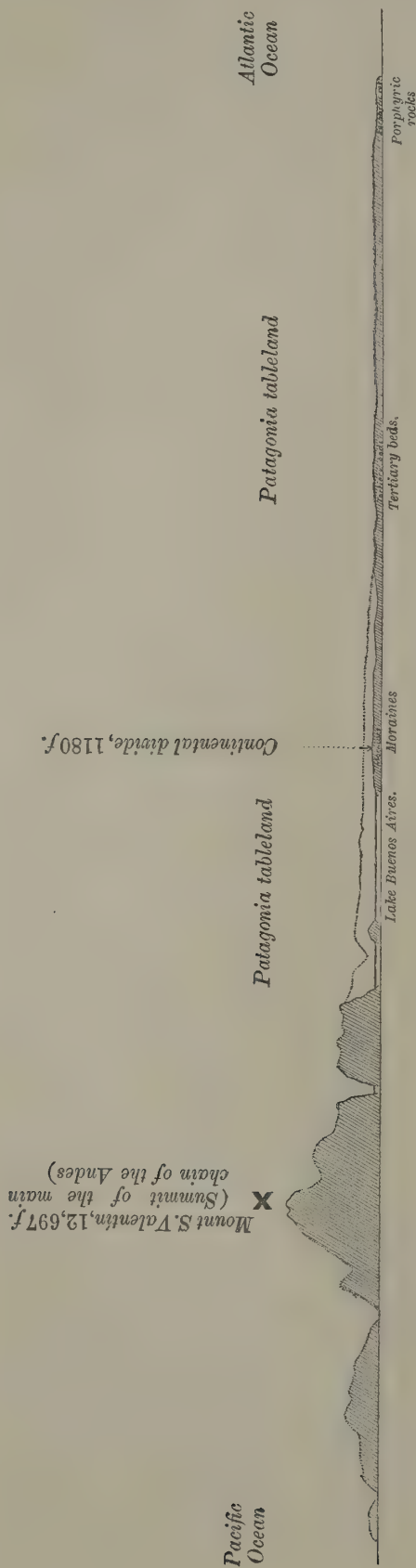
the Cordillera de los Andes the rivers flow from the east) cuts through the main chain of the Transylvanian Alps, the frontier line passes from the eastern summit to the continuation of the range to the west, *crossing the river, and thus abandoning the water-parting—foreign to the frontier agreed upon—in order to follow the general line of the summits of the chain.*

The plate on the title-page of this Report represents the summit of the Cordillera de los Andes, culminating in the Tupungato Volcano (Argentine landmark No. 133), and the Pass of the same name (No. 132). The engravings annexed herewith represent: (1) the "Morado" Gap, facing to the N.N.E. towards Mount Aconcagua; (2) the same gap facing towards Mount Tupungato and Bravard Volcano (landmark No. 129); (3) the landmark of "Las Pircas" Gap (No. 128), which is a characteristic point in the line of the high ridge of the main chain, as it exemplifies the idea of the boundary, consecrated alike by Treaties and tradition; (4) the landmark of "Quebrada Honda" Gap (No. 115), showing Mount Aconcagua to the E.S.E.

These engravings embody a graphic idea of the boundary line agreed upon, and prove that the Argentine Expert, when accepting the location of the landmarks on the continental water-parting, at the points figured in the photographs, did not take into account that divide, but only the physical features of the mountain range determined in the Treaties with whose application he was charged.

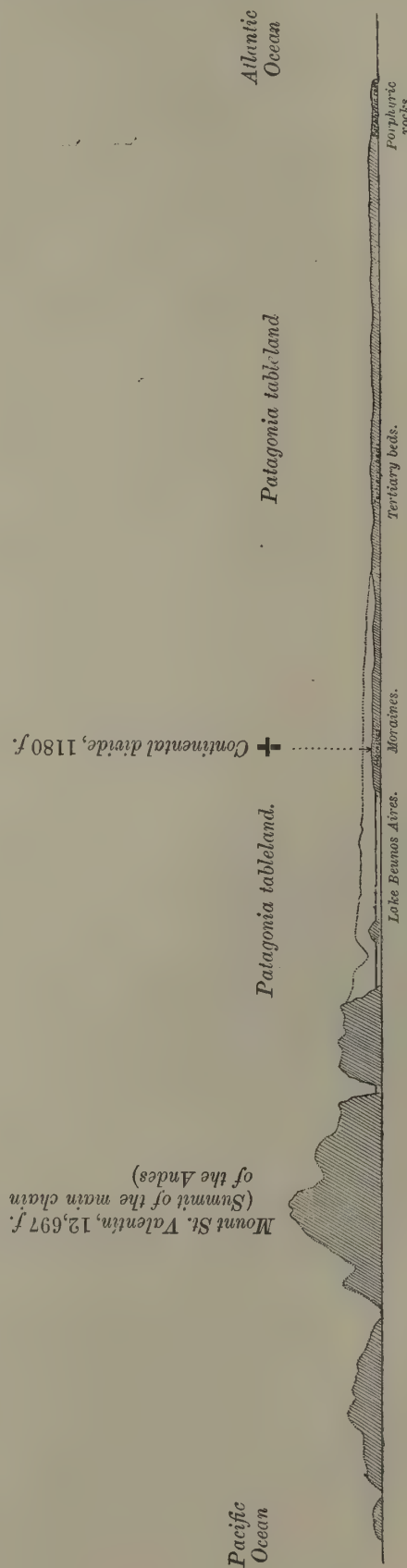
The sections at parallel 46° 30' S. lat. figured in the text (page 416), also permit of a comparison between the two different standards which respectively guided the Argentine and Chilian Experts when fixing the boundary. One transverse section (A) shows the point chosen by the Argentine Expert for planting the landmark (No. 301) upon the crest of the main chain of the Cordillera at Mount San Valentín, height 12,697 feet. The other transverse section (B) shows the points chosen by the Chilian Expert to locate, at the same latitude, the landmarks at the "point named opening of Pariaiken" (No. 320), 1180 feet, and at "unnamed (foot of the tableland) No. 321,"* considering these points as the *crest of the main Cordillera de los Andes*, because there occurs the abnormal continental water-parting, without taking into account that there is not to be found any Cordillera, but more or less incoherent matter, as loose gravel of fluvio-glacial origin, volcanic ashes and tertiary clay and sand, in every direction, the valley being only dominated by the Patagonian tableland, and the summit of the true Cordillera de los Andes being situated 120 miles to the west.

* Record of August 29, 1898.



SECTION A.—ARGENTINE BOUNDARY LINE.

X Landmark No. 301, on the summit of the main chain of the Andes (Mount San Valentin), according to the Argentine Expert.



SECTION B.—CHILIAN BOUNDARY LINE.

+ Landmarks Nos. 320 and 321 (opening of Parialken and unnamed foot of the table-land), on the summit of the "main chain of the Andes," according to the Chilean Expert.



6. THE BOUNDARY LINE AT THE BIFURCATION OF THE CORDILLERA.

The Treaty of 1881 and the Protocol of 1893 provide for the case of a possible bifurcation of the Cordillera de los Andes, and a case of this kind occurs near lat. 38° S. The main chain continues towards the south, but a considerable spur of the Cordillera stretches S.S.E. and loses itself in the centre of the Argentine territory of Neuquen. Between the said spur and the main chain rises the Bio-Bio, which, descending towards the north-west, cuts the said chain and empties itself into the Pacific.

The Argentine Expert, proceeding according to the principle which he has explained in the Records, and which has governed his actions, according to the power given to him by the Treaties, declared that :—

“Abiding strictly by the letter of the Treaty of 1881 and Protocol of 1893 on marking off on the ground the divisional line, said line should cut the river Bio-Bio, because he considers that the mountains lying to the east of the upper course of the river *do not correspond with the main range of the Cordillera de los Andes*, but that, actuated by reasons of justice and equity, he accepts the line which, starting from Mount Copahue, is proposed by the Chilian Expert, . . . up to the Pass of Santa María which is comprised within the central chain or main range of the Andes, thus leaving the upper valley of the river Bio-Bio in territory of the Republic of Chile. He declares that by proceeding thus he does so in exercise of the rights of his office, and takes into account that when the Boundary Treaty was signed it was the general belief in Chile, based on official documents, that this valley (possessed and occupied by Chile) lay west of the edge or culminating line of the Cordillera or main range of same, and therefore in Chilian territory.

“The Expert of the Argentine Republic considers it his duty to aim at a satisfactory, equitable and just manner of defining the line which his Government has entrusted him to trace, grounded on the letter and spirit of the Treaty of 1881 and on the idea which has led to this arrangement and to the subsequent ones which determine said line, bearing also in mind the state of the knowledge of the topography of the Cordillera de los Andes in the years when said Covenant was negotiated and signed.

“At that time the general watershed of the Cordillera was considered inseparable from the latter's central or prevailing chain; and the crest thereof, that is to say, of the snow-capped chain of the historians and geographers of all times, was for the signatories of the Treaty of 1881, and for those who accepted it, the only international boundary, although they knew that this chain was crossed, not only in one, but in several cases, by rivers having their sources to the east of same.

“He declared likewise that the acceptance, on his part, of the boundary line between

the volcano of Copahue and the Pass of Santa María, for the reasons stated, cannot and should not establish a precedent when deciding other points of the same divisional line."

This decision of the Argentine Expert was arrived at in the friendly spirit in which were framed the Treaty of 1881 and the Protocol of 1893, because he considered it within his rights to apply the Treaties according to his conviction when on the work of demarcation, and also because he considered this concession could be made without endangering the strategic line of defence to be established by the boundary line. At the same time, he sought for equitable solutions which would obviate disputes between two nations which perpetual harmony should unite.

When surveying the ground, the Argentine Expert found that, after leaving the Copahue Volcano, the Andean Cordillera showed a bifurcation: one of the branches goes in a S.S.E. direction, with a considerable height at first, which soon diminishes until it loses itself in the centre of the territory of Neuquen; whilst the main chain and adjacent ridges and spurs, prolonging their general trend, are crossed by the River Bio-Bio, whose eastern and southern sources rise in the western slope of the afore-mentioned branch. The Treaty of 1881 and the Protocol of 1893 direct that, in case of bifurcation of the Cordillera and where the dividing line of the waters is not clear, any difficulties arising shall be amicably settled by the Experts; and the Argentine Expert, having found that the river Bio-Bio cut the main chain of the Andes, but likewise that the Cordillera bifurcated and that the eastern and southern sources of the Bio-Bio were situated in the area between the main chain and its branch, he considered that the difficulty should be solved by leaving under Chilean jurisdiction the whole of the valley over which that country exercised sovereignty at the moment of demarcation.

The Argentine Expert was empowered by reason of the wide scope of his mission to decide, in the case of the bifurcation of the Cordillera, as to what coincided with equity and justice. Chile had always considered at the time of the Treaty of 1881 that the river Bio-Bio had its sources to the west of the culminating ridge of the Cordillera, and that therefore they were situated in Chilean territory, and she had built small forts in that valley at the time of the advance of the Argentine and Chilean forces against the Indians in 1881; later on she peopled the valley, selling and letting land, against which procedure the Argentine Republic had not protested.

The Argentine Expert considered the political responsibility of this amicable solution, which contributed in no small degree to allay public excitement in Chile. He thought that had the upper valley of the Bio-Bio been taken possession of by the Argentine Republic, and, as a consequence, the Chilian military posts established there had been withdrawn, perpetual discord would have been created between the two nations.

Moreover, he had as a reason, the fact that an excellent natural limit could be established in the Arco Pass (1374 metres, 4508 feet), which is also closed during the winter to international communication; whilst in the immediate regions to the west are to be found wide openings in the main chain, at the point where it meets the river, which facilitated from early times the jurisdiction of Chile over the higher valley, and its continuous communication with the inhabited places of that nation.

The two countries require a well defined frontier, and one easy to guard, for strategical and fiscal reasons, and the line accepted by the Argentine Expert, between Cerro Copahue and Santa María Pass, gives them such a frontier.

7. INAPPLICABILITY OF THE LINE OF THE CHILIAN EXPERT.

In order to make it evident that the Argentine Republic has never thought of taking the dividing line with Chile outside of the Cordillera de los Andes, and that she would never have consented to take it out of the said Cordillera, it will suffice to examine the *pretended main chain separating the tributary waters of the Atlantic and of the Pacific* as has been maintained by the Chilian Expert, and which the Representative of Chile now seeks to maintain before the Tribunal, affirming that such a line is the consequence of the interpretation of the Treaty of 1881, and pretending, against the Agreement of 1896, that it is this interpretation which has been submitted to the arbitration of Her Britannic Majesty's Government. When the Tribunal examine the plan in which the Chilian Expert has drawn his line, and in which *the place occupied by the Cordillera has not been marked*—as if to render more conspicuous the political error of the proposed line—it will be seen that if such an impossible frontier line were to be marked out between the two countries the defence of the Argentine territory would be left permanently exposed. It is no exaggeration to say that the projected line of the Chilian Expert hands

over to Chile, starting from parallel 40° southwards, with few exceptions, the whole Cordillera with all its passes, giving to her in its entirety that almost inaccessible wall, at the same time carrying the frontier across the Argentine Pampas in Patagonia. It further gives to Chile the right to maintain armed forces eastward of the Andean Cordillera, thus completely frustrating the far-seeing Argentine policy embodied in the Treaty of 1881, which not only settled that the frontier is to be in the crest of the Cordillera de los Andes, thereby relegating the Chilean forces to the west of the rugged mountain, but established, moreover, an absolute prohibition to fortify the Chilean coasts of the Straits of Magellan so as to give to the Argentine Republic a secure southern frontier.

Such a line as that put forward by the Chilean Expert, and now defended by the Representative of Chile, is contrary to the vital interests of the Argentine nation, contrary to the Treaties of 1881, 1893 and contrary to the terms upon which the two nations have accepted the Arbitration in the Agreement of 1896.

The Argentine Republic has agreed with Chile respecting the frontier on the Cordillera de los Andes, in its main chain, to reserve to herself the sovereignty and control of the territory, with all its features, to the east of that main chain; and it has been made an Agreement providing that, in case the Experts should have any differences as to the placing of the landmarks in the Cordillera, these shall be fixed by the Arbitrator after a survey of the ground—that is, after ascertaining where the Cordillera de los Andes is situated. She has not agreed to anything else. The British Government, when they have before them the surveys made by the Commission to be appointed to examine the ground, will have the evidence that it is not possible, nor is it consonant with the aspirations of peace and progress, that the Argentine Government and Congress, without being compelled in any way to do so, *could have agreed in 1881, 1893 and 1896 to give up the most important interests of the national defence, by consenting to abandon that immovable barrier of the Cordillera de los Andes, which has always constituted the national defence and the frontier with Chile.* It is impossible that Argentina can have agreed to this in order to seek, as the Chilean Expert states was the case, the sources of rivers, almost unknown when the Treaty of 1881 was made, and to make them the immovable *dividing line* of the two nations.

The Argentine Republic, when maintaining as the natural and immovable boundary the Cordillera de los Andes, is seeking not only to preserve her inheritance received from Spain, but also the development of her productive

capacity, the easy defence of the national territory, and thereby to ensure the benefits of peace, which otherwise might be exposed to contingencies which it was the interest of both countries to avoid.

8. THE CHILIAN STATESMEN AGAINST THE CHILIAN EXPERT.

A Chilean diplomat has recently stated, quoting Vattel, "that every interpretation that leads to an absurdity must be rejected," and this passage could be rightly applied to the line proposed by the Chilean Expert. Doubtless the Representative of Chile, in maintaining this line, did not take into account the features of the ground for which it was planned, and, besides, it may be said that there appears to be a great misconception regarding those features on the part of the Chilean Government and statesmen of that country.

The Chilean Government has brought together and published* all the information regarding the controversy as to the Puna de Atacama, i.e. as to that part of the Argentine-Chilean boundary comprised between parallels 23° and 26° 52' 45" lat. S., and which had not been submitted to arbitration. Amongst those documents are to be found: the Report of the Delegates sent by Chile to Buenos Aires in 1899, to solve the differences upon that section of the frontier; "the learned opinion" of the Delegate, Señor Mac Iver; and the memorandum drawn up, by order of the Chilean Government, by the Minister Plenipotentiary of Chile in the United States of America, Señor Carlos Morla Vicuña. The Chilean Minister for Foreign Affairs, when communicating the said documents to the Congress of his country, said: "Its perusal will carry the conviction that, in the honourable task of defending the Chilean rights to the Puna de Atacama, the Government was supported with exceptional intelligence and patriotism, by these distinguished personages."† It will be shown, in due course, that the competent statesmen who, at Buenos Aires, defended the respective part of the line proposed by the Chilean Expert, considering it to be *located within the Cordillera de los Andes*, defined the boundary in a manner completely contrary to the interpretation which Señor Barros Arana gives to the words "main chain of the Andes." In fact, they agree with

* Documentos relativos á la Conferencia de Buenos Aires, Santiago de Chile, 1899.

† Memoria del Ministro de Relaciones Exteriores, Culto y Colonización, presentada al Congreso Nacional en 1899, Santiago, 1899, p. 59.

the definition of the Argentine Expert—though they applied it erroneously—when maintaining that the mountain chain, cut by the rivers Susques and Patos in the Cordillera Real de Bolivia, which they considered to be the Cordillera de los Andes, combines, according to them, the conditions of altitude, continuity of lofty summits and division of waters, contemplated in the Treaties. And not only the Delegates agree with the Argentine Expert, in opposition to the opinions of the Chilian Expert, but also the Minister Plenipotentiary, Señor Morla Vicuña, who is thoroughly acquainted with the Argentine-Chilian boundary question, has stated *:—

“The Chilian Experts have interpreted those Treaties as signifying that the frontier line between both countries must be the continuous line of the *divortium aquarum in the Andes*, and that *the chain of these mountains through which runs the most important and principal line dividing the waters, must be considered, by reason of its continuity and of its being the line of intersection of the general planes, eastern and western, as the main chain of the Andes.*†

“The Argentine Experts have interpreted the Treaties of 1881 and 1893 as signifying that the line of frontier must follow along the highest summits without taking into account the continuous and principal line dividing the waters, and that the *series of the highest summits, independently of the divortia aquarum, must be considered as the main chain.*

“These conflicting opinions, in that part which gave rise to divergences in the delimitation between the two countries south of parallel of lat. 26° 52' 45" S., are now submitted to the arbitration of Her Britannic Majesty.”

The error into which the distinguished diplomat has fallen with regard to the Argentine line is due perhaps to the Chilian Expert, who has caused the erroneous impression to prevail that the Argentine Experts have maintained pretensions to a line jumping from peak to peak; but the passage quoted is of exceptional importance, considering that said interpretation comes from Señor Morla Vicuña, who, as Chilian Minister for Foreign Affairs, advised the Chilian Expert, in the name of the President of Chile, to accept the Argentine proposal as to the surveying of the ground, the aim of which was to be, as soon as possible, in a position to decide on the general frontier line “in the Cordillera de los Andes.” This opinion of Señor Morla Vicuña differs from that maintained by the Chilian

* Documentos relativos, etc., pp. 111 and 112.

† Señor Morla Vicuña says in a footnote: “The International Commission for the Delimitation of Bulgaria declared, in its second session held in Constantinople in September 1879, owing to the proposal of the British Commissioner, General Hamley, and with the concurrence of the Commissioners for Austria, France, Germany, Italy, Russia and Turkey, that the words *main chain* must be understood to be *the line of the great watershed* (la ligne du grand partage des eaux).”

Representative before the Tribunal, when defending the line of Señor Barros Arana with an array of arguments which do not harmonize with the views held by the highest authorities of his country.

On December 14, 1898, the President of Chile gave an official banquet in honour of the Minister Plenipotentiary of Chile in the Argentine Republic, Don Enrique de Putron, and of Señores Altamirano, Mac Iver, Matte, Zegers and Pereira, the Delegates from Chile to the Conference held at Buenos Aires for the purpose of settling the difficulties which had occurred in the delimitation of the frontier in the Cordillera de los Andes between parallels of lat. 23° and $26^{\circ} 52' 45''$ S. On that occasion, the Chief of the Cabinet, Señor Carlos Walker Martinez—whose already quoted opinions as Minister for Chile in Bolivia, respecting the traditional boundary of Chile in the lofty ridge of the Cordillera of the Andes, are of considerable importance—addressed the following words:—

“In the name of His Excellency the President of the Republic, I have the honour to greet the Minister Plenipotentiary of Chile and the distinguished gentlemen who with him will take part in the Conferences intended to bring about a definite solution of our international problems.

“The country confides to them the sacred representation of its rights, and in view of their ability and faculties it anticipates that the issue of their mission *will be a link as perpetual and immovable as the gigantic Cordillera which they are going to cross.*”

In the speech which Señor de Putron made on January 14, 1899, when delivering to the President of the Argentine Republic the credentials which accredited him as Minister Plenipotentiary for Chile, the following words are to be found:—

“And as peace is the germ of prosperity, and under its cover, labour, commerce and industry live and thrive, I hope, Sir, that these powerful currents of social life, encouraged under the safeguard of your protection, by concessions of reciprocal international utility, will reach rapid and fruitful development.

“*And to secure their future peace, and bind them with bonds of mutual good fellowship, we must, above all, surmount** THE FORMIDABLE BARRIERS WHICH NATURE HAS PLACED BETWEEN THE TWO REPUBLICS.”

When the Chilean Delegates returned to Santiago from the Conferences at Buenos Aires, where the difficulties already alluded to were settled, the President of Chile gave them a second official banquet on April 22, 1899. On that occasion, in reply to the toast of the President, the Delegate, Señor Eulogio Altamirano, a personage of the highest political and social standing, said:—

* The Chilean Minister refers to the Transandine Railway now in course of construction.

"Our destinies, as the illustrious Argentine President truly said, run parallel, encouraging one another in the career of progress, but without ever meeting; and if unfortunately, this elemental truth should be forgotten by the future leaders of our destinies, *there stand the Andes to oblige them to reflect, there is that immense mass of snow and granite which—when, perhaps to-morrow, the civilising whistle of the locomotive is heard at the various points of the long transit—will have disappeared as an obstacle, to give passage to brother and friend, and to the interchange of the fruits of the earth and the products of trade—but will still rise as a majestic and almost impassable barrier to the armies which, thwarting the designs of God and the manifest indications of the destiny of two peoples, might attempt to scale it with conquest and ambition in view.*"

On the occasion of the presence of an Argentine training ship in the port of Valparaiso, the cadets were invited to an excursion to Santiago, in the course of which the Mayor of the Chilian capital pronounced an official discourse in which he used these words:—

"*The Cordillera which divides us is at the same time common to us both, and the fires of its volcanoes are like luminous flames with which it pleases the Divine Creator to mark out the future paths of the two sister Republics. The pampero is not the only wind which comes to refresh the immense savannah of the Argentine Pampas, burned by the scorching sun, there is also the thermal wind which descends from the summit of the Andes to vivify and fertilise our narrow mountain valleys, and both form immeasurable currents of sympathy uniting Chile to Argentina.*"

The *immovable gigantic Cordillera* to which the Chief of the Chilian Cabinet refers; the *formidable barriers which Nature has placed between the two Republics*, according to the expression of the Minister Plenipotentiary of Chile at Buenos Aires; *the Andes, that immense mass of snow and granite which rises as a majestic and almost an impassable barrier to armies which, thwarting the designs of God and the manifest indications of the destiny of two peoples, might attempt to scale it with conquest and ambition in view,*" according to the eloquent phrases of the eminent Chilian Delegate; *the Cordillera, the summit of the Andes, wherefrom descend the wind which vivifies and fertilises the narrow valleys of the Chilian mountains, and that which refreshes the immense savannah of the Argentine Pampa*, to which the Mayor of Santiago made allusion; that Cordillera, those Andes, are the traditional, the immovable boundary imposed by Nature herself between the two nations.

Would it be possible to apply those descriptions to the line of the Chilian Expert? What gigantic Cordillera does he follow to the south of parallel of lat. 40° S.? What formidable barrier does the traveller meet when crossing the opening of

Quilquihue, the swamp of Mascardi and Gutierrez, the opening of Cholila, the plains of Esquel and Sunica, the meadows of the Carrenleufú, of the river Pico, of the river Frias, the plains of Coyet, the basin of Coyaiken, the valleys of the Laguna Blanca, those of the Lake of Buenos Aires, of the river Fénix, of Gio, of Posadas and Olin, of Lake Belgrano, of the river Mayer, of Lakes San Martin and Tar, of Vizcachas and Coyle, and of the river Gallegos? There is no immense mass of snow and granite to prevent fratricidal wars; instead of it only sand, gravel and marshes are to be found, and the eye roams over the immense Pampa without meeting a barrier of any description. But far away to the west can be discerned the snowy mass of the colossal Cordillera to which all the leading men of Chile refer, and over which the Argentine Expert has traced his line.

The Chilean statesmen were imbued with ideas similar to those recently maintained by the British Government in the following terms:—

“A natural feature, to make an efficient frontier boundary between States, should fulfil the following two main conditions: IT SHOULD BE EASY TO DISTINGUISH, AND IT SHOULD BE DIFFICULT TO CROSS.”*

But the Chilean Expert set aside those ideas when proposing his boundary line. One of the accompanying plates represents the Cordillera de los Andes, embodying all the conditions required for an *arcifinious* limit; the photograph has been taken from a point situated in the main chain, on the boundary line projected by the Argentine Expert, and perfectly characterises the natural and traditional boundary as stipulated in Treaties and as preconised by the highest authorities quoted—“*easy to distinguish*,” “*difficult to cross*.” The other plate represents the *pretended* summit of the main chain of the Andes, according to the Chilean Expert, taken from a “nameless opening” marked on his proposed line with numbers 299 and 300 at the origin of the river Pico in the continental divide.

To compare the two plates is to obtain a vivid demonstration of the correctness of the Argentine Expert's interpretation of the boundary, and the incorrectness of the Chilean Expert's proposed line, extraneous not only to the main chain of the Cordillera but also outside of this. Is the natural boundary here “*easy to distinguish*”? Can it “*be difficult to cross*”? There is a great difference between the opinions of Señor Barros Arana, historian and geographer, and Señor Barros Arana, Expert. Where in the morainic region, reproduced in

* Case presented on the part of the Government of Her Britannic Majesty to the Tribunal of Arbitration between H.B.M. and the U.S. of Venezuela, London, 1889, p. 145.

the photographic panorama, across which he pretends to trace the boundary line, are to be found the "*rugged mountains*," the "*steep defiles*," the "*numerous volcanic cones*"? Where may be found the "*inaccessible summits that lose themselves in the region of eternal snows*"; the "*huge and massive Cordillera de los Andes, which rears itself on the east*" of Chile; the "*bulky and steep Cordillera de los Andes, stretching from north to south like a gigantic wall*," and constituting always a formidable and impassable "*barrier between Chile and the Argentine Republic, which is only broken by narrow and majestic defiles*"?

After the Treaty of 1881, which stipulated that the boundary line between Argentina and Chile must run along this formidable barrier, and when it has been recognised by all his countrymen, Señor Barros Arana, as has been before stated, suppressed the words which he had written, as an acceptance of that boundary. It is not inappropriate to point out that while Señor Barros Arana suppressed, in his *Geografía física*, the true limit in the Cordillera, he yet retained up to his last edition (1888) that passage in which he says that the possession of Patagonia is claimed at the same time by both Chile and the Argentine Republic, though he knew that the question had been definitively settled in the Treaty of 1881. The ignoring of the Covenant in this fundamental part, would perhaps explain his ulterior tendency to pretend the division of Patagonia between the two countries, proposing, in order to achieve this, a boundary line against all laws of nature and nations.

The engraving here given further illustrates the unsuitability of the Chilean proposed line. It reproduces the region of the Vizcachas river at the points where the Chilean Expert has located the "unnamed Pass No. 238 and the unnamed Pass No. 239," considering the passes as situated in the summit of the main chain of the Cordillera. Its examination will also demonstrate the error of his conception on the crest of a mountain range.

Señor Alejandro Bertrand, who knows personally this region, has published recently a short description of his country, in which he says:—

"Chile is a relatively narrow strip of land, stretching from 18° to 54° S., *between the Cordillera of the Andes and the western coast line of South America*. . . . The upheaval of the *Cordillera of the Andes, which separates Chile from the Argentine Republic*, was the result of crustal movements occurring long after the formation of the rocks composing the range, the chief of which are porphyry sandstones and metamorphic rocks. The Chilean-Argentine Andes contain the highest peaks of America, one of which, Aconcagua, attains an elevation of 23,000 feet." *

* International Geography, H. R. Mill editor, London, 1899, p. 843.

ARGENTINE-CHILIAN NATURAL BOUNDARY.

"A natural feature, to make an efficient frontier boundary between States, should fulfil the following two main conditions: it should be easy to distinguish, and it should be difficult to cross."

Case presented on the part of the Government of Her Britannic Majesty to the Tribunal of Arbitration between Her Britannic Majesty and the U.S. of Venezuela, London, 1899, p. 148.

ARGENTINE-CHILIAN BOUNDARY QUESTION

MAIN RIDGE



PANORAMA FROM THE "CONTRABANDISTAS" GAP

(4436 ft.; 14,557 ft.).

ARGENTINE LANDMARK No. 121, IN THE MAIN CHAIN OF THE ANDES, ACCORDING TO THE ARGENTINE EXPERT. CHILIAN LANDMARK No. 122.

FRONTIER LINE AGREED BY THE RECORD OF THE EXPERTS, DATED OCTOBER 1, 1898.

VIEWS OF CHILIAN STATESMEN ON THE BOUNDARY LINE.

Chain "constituting always a barrier between Chile and the Argentine Republic."—SEÑOR BARRIOS ARANA, *the Chilean Expert, as Historian.*

The "huge and massive Cordillera de los Andes," "of inaccessible summits that lose themselves in the region of perpetual snows;" "the

bulky and steep Cordillera de los Andes stretching from North to South like a gigantic wall."—SEÑOR BARRIOS ARANA, *the Chilean Expert, as Historian.*

The "perpetual," "immovable," and "gigantic Cordillera."—SEÑOR WALKER MARTINEZ, *Chief of the Chilean Cabinet in 1899.*

The formidable barriers which nature has placed between the two Republics. SEÑOR DE PUTRON, *Chilean Plenipotentiary in Argentina.*

The line of intersection of the general plans, eastern and western, in the Andes, as the main chain of the Andes.—SEÑOR MORELA VICTORIA, *Chilean Minister at Buenos Aires.*

The Andes, "immense mass of snow and granite;" "majestic and almost impassable barrier to the armies which, thwarting the designs of God and the manifest indications of the destiny of two peoples,

might attempt to scale it with conquest and ambition in view."—SEÑOR ALFAMBRANO, *Chilean Delegate at the Conference at Buenos Aires, 1899.*

"The Cordillera," the "summit of the Andes," wherefrom descend the wind which "vivifies and fertilises the narrow valleys of the Chilean mountains," and that which "refreshes the immense savannah of the Argentine Pampas." MAYOR OF SANTIAGO, CHILE, in 1898.

SS."

Tribunal of Arbitration
1899, p. 145.

MOUNT ACONCAGUA
(7130 m.; 23,393 f.)



[Face page 425.]

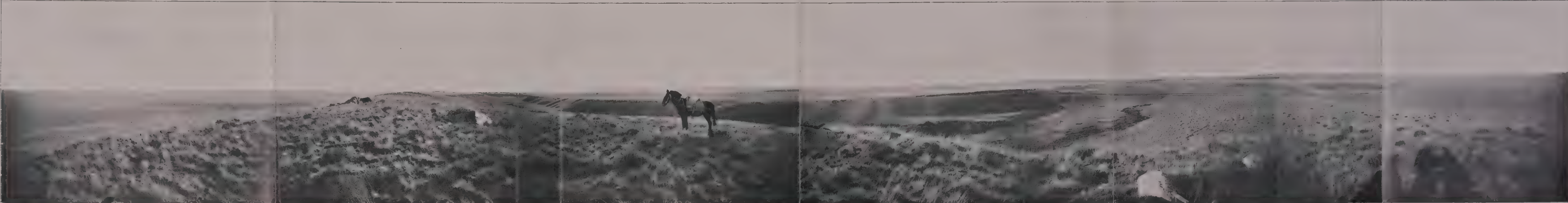
and ambition in view."—SEÑOR
Los Andes, 1899.

the Andes," wherefrom descend
the narrow valleys of the
reaches the immense savannah
VALLEJO, CHILE, in 1898.

"A natural feature, to make an efficient frontier boundary between States, should fulfil the following two main conditions: it should be easy to distinguish, and it should be difficult to cross."

Case presented on the part of the Government of Her Britannic Majesty to the Tribunal of Arbitration between Her Britannic Majesty and the U.S. of Venezuela London, 1899, p. 146.

ARGENTINE-CHILIAN BOUNDARY QUESTION.



PANORAMA FROM THE SOURCES OF THE RIVER PICO
(815 m.; 2674 f.).

CHILIAN LANDMARKS Nos. 299 and 309, in a "nameless opening."

NOT ACCEPTED BY THE ARGENTINE EXPERT, CONSIDERING THAT THE GROUND IS NOT SITUATED WITHIN THE CORDILLERA DE LOS ANDES, BUT OUTSIDE OF IT IN TERRITORY UNDER ARGENTINE SOVEREIGNTY, ACCORDING TO THE TREATY OF 1881 AND PROTOCOL OF 1893.

Fluvio-glacial plain in the Patagonian tableland where the continental *divortium aquarum* occurs, to the east of the Cordillera de los Andes, and considered by the Chilean Expert as the crest of the main chain of said Cordillera, as stated in the Record of January 1, 1894,

viz.: The Chilean Expert declares that "by the words *main chain of the Andes* he understands the uninterrupted line of crests which divide the waters and which form the separation of the basins or hydro-graphic regions which are tributaries to the Atlantic on the east and

to the Pacific on the west, thus determining the limit between the two countries, according to the principles of geography, the boundary Treaty, and the opinion of the most distinguished geographers of both countries."

"It is equally true that this line (the *divortium aquarum*) lies very much to the east of the snowy peaks, amongst which the series of the highest summits should be looked for."—DR. STEFFEN, of the *Chilean Boundary Commission*.

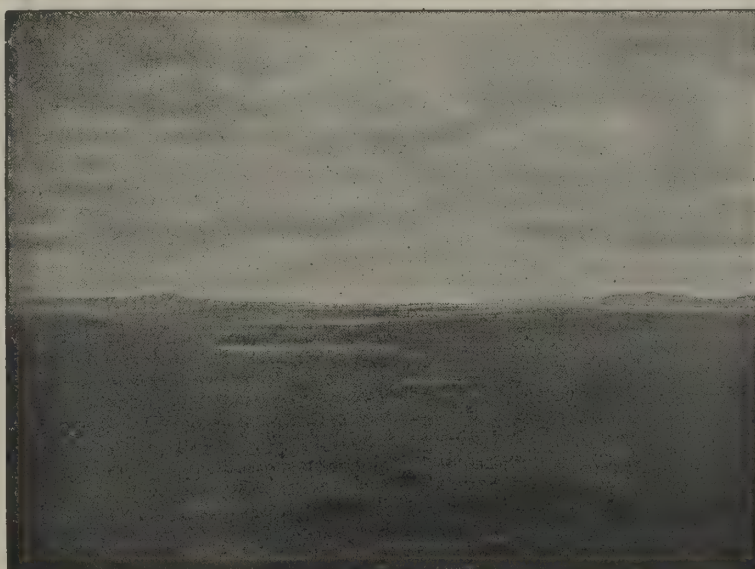
[Face p. 145.]

The same Señor Bertrand had said on another occasion :—

“Every ridge of mountains is composed of points alternately higher and lower, like the teeth of a saw (*sierra*), by which name they are frequently designated.”*

In Vizcachas Plain nobody will find the “*Cordillera of the Andes which separates Chile from Argentina*,” nor the range which contains “*the highest peaks of America*,” nor anything resembling “*the teeth of a saw*,” nor even a slight undulation which might justify anybody in calling those flat lands Cordillera de las Vizcachas.

The already quoted Chilian statesmen logically interpreted the Treaties of 1881 and 1893, and referred to the same frontier supported by the Argentine Expert at the August and September meetings. They were perfectly aware that when, in 1876, the Chilian Expert, Señor Barros Arana, then Minister Plenipotentiary of Chile in the Argentine Republic, proposed in a vague manner to the Argentine Minister for Foreign Affairs, Señor Bernardo de Yrigoyen, the *divortium aquarum* as boundary between the two countries, the latter rejected it; and that the principle of the demarcation along the summit of the Cordillera de los Andes was then accepted as it now stands in the Treaty of 1881.



CONTINENTAL DIVIDE IN THE PLAIN OF VIZCACHAS.

Can the cited passages be applied to the Chilian Expert's line in the portion which is not agreed upon? His line is almost entirely situated outside the Cordillera de los Andes, and *therefore outside the Treaties of 1881 and 1893 and outside the Arbitration according to the stipulations of the Agreement of 1896.*

The opinions of the Delegates to the Conference of Buenos Aires and of

* Estudio Técnico, Documentos y Apéndices, p. 120.

Señores Morla Vicuña, Walker Martinez, De Putron, Altamirano, and of the Mayor of Santiago were expressed some time after the submission to Her Britannic Majesty's Government of the differences arisen between the Argentine and the Chilian Experts. Moreover, one of these opinions, that of Señor Morla Vicuña, was published by the Chilian Government, eulogising it, on June 1, 1899—that is to say, after the reading by the Chilian Representative, on May 8, 9, 11, 1899, of the statement in which he sought to defend the indefensible line of Señor Barros Arana.

The Chilian Government and the Chilian statesmen refer to the boundary of the Cordillera de los Andes, a boundary essentially geographical, in the tracing of which ten years have been spent in discussions and surveys, their sequel being the present Arbitration. The moment has, then, arrived for the Arbitrator to decide whether the points mentioned by the Argentine Expert are situated or not on the summit of the agreed range; and it is at this juncture that, in the Chilian Statement read before this Tribunal, it is sought to alter radically the matter of Arbitration.

The Chilian Expert has more than once said that from the day he was appointed he had planned the line, considering, therefore, unnecessary for its knowledge and tracing any survey of the ground; and to the very last he has maintained similar views, trying to modify the stipulations of the Treaties. The Chilian Government, in 1890, in 1893, in 1896 and in 1898, considered a knowledge of the geography of the Cordillera to be indispensable. The Chilian Expert *maintained then that the Arbitrator must firstly decide on an abstract principle. Both Governments, however, acting in conformity with the Treaties, had submitted to the Arbitrator only geographical differences,—fully aware that those differences solely, that is to say, a determination of the summit of the Cordillera de los Andes, constitutes the matter in dispute.*

CHAPTER XV.

- Summary*—1. CONSIDERATIONS ADVANCED IN DEFENCE OF THE CONTINENTAL DIVORTIUM AQUARUM.
2. ERRONEOUS VIEWS ON THE MAIN CHAIN OF THE ANDES.
 3. THE WORK OF DEMARCATION.
 4. SUPPOSED ADVANTAGES OF THE CONTINENTAL DIVIDE.
 5. RULES OF INTERNATIONAL LAW.
 6. THE CONTINENTAL DIVORTIUM AQUARUM IS NOT STIPULATED IN THE TREATIES.
 7. THE BOUNDARY MUST BE OROGRAPHICAL AND NOT HYDROGRAPHICAL.
 8. THE WATER-PARTING LINE DIVERGES FROM THE MAIN CHAIN OF THE CORDILLERA, AND IN SOME POINTS IS OUT OF IT.
 9. ON THE SIDE OF THE ARGENTINE REPUBLIC THERE IS MORE FACILITY OF ACCESS TO THE WATER-PARTING LINE.
 10. THE DIVORTIUM AQUARUM IS NOT A PERMANENT LINE.

1. CONSIDERATIONS ADVANCED IN DEFENCE OF THE CONTINENTAL DIVORTIUM AQUARUM.

THE Representative of Chile, after having analysed, in the statement read before this Tribunal, various clauses of some of the Treaties in force, insists upon the doctrine of the separation of the tributary rivers of the Atlantic and of the Pacific Oceans, bringing forward a long array of arguments, all of which, in his opinion, support that doctrine in the most decisive manner. The most important of those arguments are—

1. That the *divortium aquarum* is the typical feature which serves to characterise the main chain of the Cordillera.
2. That the work of demarcation shows that the Experts and Assistants of both countries have considered as the boundary line, that which separates the interoceanic hydrographical basins.
3. That the continental divide, theoretically considered, offers obvious advantages for its acceptance as a boundary, owing to its being easy to mark out, natural, permanent, strategic, generally adopted, and because it always maintains “in its course a more uniform average height.”

4. That International Law, as a rule, favours the division of the waters for a frontier between countries separated by mountains.

Nearly the whole of these arguments have been examined in the course of this Report; but even at the risk of repeating already adduced considerations, it is useful to deal with the views expressed in the Chilian Statement in the same form in which they have been presented.

Besides, the Representative of Chile, foreseeing some of the objections which naturally arise against the theory of the continental divide, has undertaken the difficult task of minimising their importance. He says that those objections have been put forward by the various Representatives that the Argentine Government have appointed to take charge of the question, and that they may be reduced to the following :—

1. The *divortium aquarum* is not stipulated in the Treaties.
2. The boundary must be orographical and not hydrographical.
3. The water-parting line diverges from the main chain of the Cordillera, and in some points is out of it.
4. On the side of the Argentine Republic there is more facility of access to the water-parting line.
5. The *divortium aquarum* is not a permanent line.

It is also useful, for the sake of method, to consider the arguments relating to each of these several points, before entering into the detailed comparison of the lines proposed by the Experts of both countries, and before studying the consequences which derive therefrom.

As a preliminary observation, may be noticed the way of reasoning that the Chilian Statement reveals. When examining the Treaties, or when expounding theoretical advantages, the mere *divortium aquarum* is spoken of; but only when stating the conclusions arrived at, the word “continental” appears. Thus the indisputable advantages of the *divortium aquarum*, when localised in the summit of the main chain of the Cordillera, are sought to be applied to the “continental divide,” which often occurs where there is no Cordillera or main chain. The reasonings only suitable when dealing with mountains, are afterwards applied to plains; and it is thought that the error may pass unnoticed by using alternatively both expressions “*divortium aquarum*” and “continental divide”; it is also thought that by employing one of them when arguing and the other when stating the conclusions arrived at, the transformation of mountains into plains is not to be remarked. In order to avoid such confusions it is, therefore, essential

to bear in mind that the rules to be derived from a *divortium aquarum*, when localised in the highest crests of the Cordillera, cannot be applied to the continental divide which occurs sometimes in flat lands.

This single observation would be enough to set aside the assertions contained in the Chilian Statement relating to the above-mentioned points, but when dealing with each of them separately the errors of those assertions will be more apparent.

2. ERRONEOUS VIEWS ON THE MAIN CHAIN OF THE ANDES.

Article 2 of the Protocol of 1893 provides that, "according to the spirit of the Boundary Treaty, the Argentine Republic retains her dominion and sovereignty over all the territory that extends from the east of the principal chain of the Andes to the coast of the Atlantic, just as the Republic of Chile over the western territory to the coast of the Pacific;" as this passage, in its unsurpassable clearness, categorically orders the following of the orographic features in the marking out of the frontier line, the Representative of Chile has striven to maintain that the said passage cannot modify his opinion, and that the principal chain of the Andes is nothing else but the natural division of the waters of the South American continent.

In order to arrive at this result he begins by laying down a truth which the Argentine Republic has never objected to, viz. that mountains do not always possess the mathematical regularity that some persons suppose. The quotation of Studer, in support thereof, leads to no other conclusion,—“The idea of a central chain of mountains flanked by parallel secondary chains,” he says, “must be abandoned as an ancient error, and cannot be maintained in our days.” Of course this symmetry does not happen in every case, under all latitudes, throughout the whole extent of a chain. There are very often tangled masses, which, in the words of Reclus, “exhibit an aspect of wild confusion such as would be presented by the waves of the sea.”

But must it necessarily be concluded from this confusion that it is impossible for the man of science to determine the principal chain? Señor A. Pissis, the geologist, whom Chile has always held in such respect and admiration, begins his ‘*Geografía física de Chile*’ with a passage in which we read :—

“All mountainous regions of the globe have a similar structure; they are composed

of various systems of parallel crests, amongst which there is one system that predominates, and forms the most prominent feature in the configuration of the country."*

But this is, precisely, one of the points upon which theoretical dissertation is less admissible. Whatever may be the quotations made from authors who have formed their opinions from the observation of other Cordilleras, it is impossible to conclude that the entanglement of that of the Andes is so great as to prevent the ascertaining in a positive manner of its principal chain. In the midst of the apparent chaos, the predominating ridge of a chain, which is the principal one, stands out, because it is the highest, the most continuous, it has the most uniform general trend, its slopes shed the greatest volume of water, or, in other words, because it is "the central chain" of Señor Barros Arana, the "cordon Andino" of Señor Bertrand, the "intermediary, central or main chain" of Señor Steffen. The surveys of the ground, which Her Britannic Majesty's Government will order to be made, will bring out clearly the existence of this main chain, which has been recognised by the geographers of every country, and especially by those of Chile, as has been already stated. It is a question of facts; they must be observed *de visu*.

The Representative of Chile, taking his stand upon the orographic confusion, says that the sole method of determining the main chain is by pointing out the line dividing the continental waters, and he supports his assertion with two equally inapplicable authorities, that of Ball and that of the Commissioners who met at Constantinople for carrying out the stipulations of the Berlin Treaty.

The passage quoted from Ball would appear to be the following:—

"In each system of mountains, geographers are disposed to regard the watershed, or line which divides the waters which flow down the opposite sides of the mountain, as the main chain, and this usage is *frequently* justified."

Even were these Ball's exact words, it would be sufficient to read them to understand that they do not establish a general rule, and that, on the contrary, they show that there are cases in which the watershed forms the main chain, and others in which it does not. Can it be affirmed, in presence of the opinion attributed to Ball, that the Cordillera de los Andes to the south of 40° harmonizes with the hypothesis that *frequently*, but not always, happens?

The quoted sentence supposes that "main chain" and "watershed" are two

* Geografía física de la República de Chile, by A. Pissis, 1875, p. 2.

different things, although they are often concurrent, and adds that frequently (not always) the usage of one of these expressions as equivalent of the other may be justified.

When Ball said "watershed" in that sentence, he has been careful to define what he understands thereby, and his explanation shows a substantial discrepancy with the interoceanic water-parting. He says that the watershed "is the line which divides the waters which flow down from the opposite sides of the mountains." The watershed is therefore formed by the line of intersection of the two opposite slopes of the chain; it is the culminating edge, that whose average height is the greatest. In order to give practical application to Ball's definition, it is not possible to seek for the sources of the rivers that cut the chain, piercing and passing through both its sides. In spite of these deep fissures, caused by known geological phenomena, the line dividing the waters flowing down the opposite sides has a clear and well defined existence.

If this passage from Ball proves anything, it is that the watershed referred to by geographers is the watershed peculiar to a chain; and it is inadequate, to say the least, to base on it a doctrine which tends to leave within Chilian territory both sides of the Cordillera; whereas, on the contrary, this passage agrees with the clauses of the Treaties which mark out the frontier in such a manner that the sovereignty of each country extends over the whole of the respective mountain flank which faces it.

These conclusions flow logically from the passage which the Chilian Representative has quoted in an incomplete form, giving a truncated paragraph which is cut off in the middle of a sentence.

If the passage be restored by simply adding those words which have been suppressed, the result of the whole is in open contradiction to the theory which was attributed to Ball. He says:—

"In every mountain system, geographers are disposed to regard the watershed or boundary dividing the waters flowing towards opposite sides of the range, as marking the main chain, and this usage is often justified *by the fact that the highest peaks lie on, or very near the boundary so defined.*" *

The Chilian Representative only quoted as far as where it is said that "this usage is often justified," and he suppressed that it was justified "by the

* Encyclopedia Britannica, Article "Alps," vol. 1, p. 620, 9th ed.

fact that the highest peaks lie on, or very near the boundary so defined"; that is to say, he omitted that portion of the paragraph where the geographer accentuates his opinion when establishing that the main chain is the one comprising the highest peaks, whether through their being confined within it or owing to their being very near.

There is still more to say in connection with Ball. By means of the mutilated sentence which the Representative of Chile took from his article, it was sought to prove that he admitted that "main chain" and "watershed" are the same thing; and, nevertheless, Ball expressly refutes those who so believe; he says that the main chain is characterised by its superior height and its geological structure, and has no doubt that the main chain may be cut by rivers, as occurs with the Adige, mentioned by the said geographer. He says so in the following paragraphs:—

P. 620.—"But on the west side of Piedmont, the Alpine chain dividing Italy from France extends nearly due southward till it approaches to the Mediterranean in the neighbourhood of Nice. About forty miles north of this city, that which, *from its superior height and its geological structure, we call the main chain*, is bent round from west to east in a curve, slightly convex towards the south, till it becomes parallel to the Mediterranean shore, and is merged in the chain of the Apennines."

P. 621.—"On the east and south-east side of the St. Gothard Pass, as far as that of the Maloya, the line of watershed between the affluents of the Rhine and that of the Po is determined by what may be called accidental conditions. The chief mountain ridges which culminate in the Cima Camadra, Piz Valrhein and Tambohorn, *instead of being arranged along the parting of the waters* lie in a transverse direction, and hence the natural frontier of Italy is here more broken and irregular than elsewhere; and it is only on the south side of the Maloya Pass that the main chain assumes a tolerably continuous direction from W.S.W. to E.N.E., as between Piz Güz and the Bernina Pass it rises into the lofty group whose dominant peaks are Piz Tremogia, Piz Bernina and Piz Cambrena. Eastward of the Bernina Pass the same direction is preserved, and in the range including the Corno di Campo, Monte Zembrasca and Monte Foscagno the level scarcely sinks below 9000 feet; but beyond the last named summit, in the space lying between the Lower Engadine, the head waters of the Adige, and those of the Adda, the *semblance of a continuous ridge forming the watershed between the Inn and the Adriatic altogether disappears*. If we adhere to the usage of designating as the main chain the ridges which part the waters flowing in different directions, it must be owned that the disposition of the chief mountain masses has no connection with the direction of that chain."

P. 621.—"The break in the continuity of the Alpine chain marked by the deep valley through which the main branch of the Adige descends, first southward and then eastward from its sources to Meran and Botzen, is one of the most remarkable features in the orography of the Alps."

Nothing, as may be seen, is more extraneous to Ball's intention than the confounding of the main chain with the *divortium aquarum*. Rather, on the contrary, he notes the difference between the two features; he calls "natural frontier" one traced along mountains, and sets forth some facts which form the most complete negation of the Chilian theories.

The opinions emitted by the Commissioners assembled at Constantinople for carrying out the Berlin Treaty are still more contrary to the continental divide. In fact, the Berlin Treaty, in that part commented upon by the Chilian Representative, which speaks of the southern boundary of Bulgaria, ordered that :—

"On the south, the frontier ascends, starting from its mouth, the thalweg of the rivulet, near which are the villages of Hodzakioj, Selan-Kioj, Aivadsik, Kulibe, Sudzuluk, crosses obliquely the valley of Deli Ramcik, passes to the south of Belibe and Kemhalik, and to the north of Hadzimahale, after having crossed the Deli Kamcik at 2½ kilometres above Cengei; *reaches the crest* at a point situated in Tekenlik and Aidos-Bredza, and follows along it by Karnabad Balkan to the north of Kotel, as far as Demir Kapu. It continues along the main chain of the Great Balkan, following its entire length as far as the summit of Kosika."

The boundary, consequently, begins by a "*thalweg*," crosses a "valley," cuts a "river," follows along a "crest" and continues along a "main chain." To the south of this line lies Eastern Roumelia, regarding which it is provided by

Article XV.—"H.M. the Sultan shall be entitled to provide for the defence of the frontiers by sea and by land of the Province, by erecting fortifications upon the said frontiers, and maintaining troops."

In the section where the crest was to be followed as far as Demir Kapu, it was necessary to mark out the line within the crest and even to carry it northward of the latter, in so far as might be required to enable the Sultan to provide for the defence of the frontiers.

In the section between Demir Kapu and Kosika there had to be determined the dividing line in the "main chain of the Great Balkan," and actually to mark it out, bearing in mind the stipulation regarding the security of the frontier.

The Chilian Representative has found the following proposal framed by the British Commissioner when dealing with the line within the main chain :—

"In order to make the demarcation between Demir Kapu and Kosika, the words of the Second Part of Article 2 of the Treaty of Berlin, 'the main chain of the Great Balkan,' shall be interpreted in this sense, *that the frontier shall follow the watershed line.*"

To which "watershed line" did the British Commissioner allude? To the watershed line of the European Continent? To the principal divide so often repeated by the Chilian Representative? The minutes and communications inserted in the Blue Book answer these queries. Both the British Commissioner, General Hamley, as well as the other Representatives assembled at Constantinople understood and declared that the watershed line was to be found in the crest of the Great Balkan. No one made any allusion to plains, depressions, nor "to any kind of features."

The division of the waters, as defined by the Commissioners at Constantinople, does not imply a watershed outside the Great Balkan between Demir Kapu and Kosika. It implies the natural and peculiar divide of the highest crests, situated between the southern slope that descends towards Eastern Roumelia and the northern slope that descends into Bulgaria. Had this watershed line not been partially modified on account of military exigencies, the territory of Roumelia would have been extended through the slope of the Great Balkan as far as its vertex, and Bulgaria would have incorporated to her dominion the whole of the mountain side facing that country.

The Representative of Chile has quoted a fragmentary portion of General Hamley's proposal. By taking the passage in its entirety the idea comes out quite clearly. It reads thus :—

"From Demir Kapu to Kosika, the words of the second paragraph of Article 2 of the Berlin Treaty, viz. 'the main chain of the Great Balkan,' shall be interpreted in the sense that the frontier shall follow the watershed line, *excepting at the points where such line would not suffice for the defence of Eastern Roumelia; at these points the Commission will move the frontier beyond the crest.*"

Generally speaking, therefore, the line would follow the crest, and within it along the division of waters there occurring; but should the military defence of Roumelia require it, the frontier might deviate from the watershed and even from the crest itself. General Hamley's proposal was unanimously adopted at the sitting of May 1, 1879, with some alterations, unimportant, it is true, respecting the views of the British Commissioner, but of some importance as bearing upon the applicability of the rule thus approved to the Argentine Chilian controversy.

The definite resolution reads thus :—

"From Demir Kapu to Kosika, the words of the second paragraph of Article 2 of the Berlin Treaty, 'the main chain of the Great Balkan' shall be interpreted in the sense that the frontier shall *in general* follow the watershed line. If the Commission, after

examining the maps and the ground, should find that at certain points of the frontier the positions met with upon the southern slope of the crest were inadequate for defensive purposes, the occasion would arise (*il y aurait lieu*) for seeking these positions upon the crest itself, and likewise upon the northern slope, but nevertheless, without going beyond the limits strictly necessary for defence."

It is impossible to express an idea with greater clearness. The watershed line cannot depart from the crest itself; it is localised in the crest and separates the two slopes of the prominent chain. Should the frontier deviate from the watershed line, it is still possible to remain on the *crest*, seeing that the latter, as the Turkish Commissioner, Zahir Pasha, pointed out at the same sitting, is either a plateau or a narrow strip of land; but it is likewise possible to diverge therefrom and descend as far as one of the slopes.

The Commissioners at Constantinople never thought, therefore, that when they referred to the watershed line and of nothing more than the watershed line of a chain, they could be understood to mean that, as a consequence, the whole of the chain, with its two slopes, was to stand on one side of the line. Neither did they propose to lay down geographical definitions of universal application. They weighed matters as statesmen, and wished to give the Sultan a secure frontier that would facilitate the military defence of Roumelia. They never intended to establish a perfect synonymy between the main chain of the Great Balkan and the watershed line. A perusal of the minutes of the sittings will show that there were no doubts as to which was the main chain, known and defined even in primer books. Doubts arose respecting the marking out of the line within the said chain, and nothing else; and it was in that spirit, and starting from the accepted basis that it was not necessary to choose between various branches,—since pre-established data enabled them to decide what was the main chain of the Great Balkan,—that they decided to place the boundary line in the watershed.

The Berlin Treaty merely stated that the boundary between Demir Kapu and Kosika followed along the main chain of the Great Balkan. But it did not specify whether the demarcation should be made at the foot of the chain, upon its flanks, or upon its highest ridge. The interpretation of the European Commissioners supplied what was wanting. It was agreed to follow the general line of the watershed; it was likewise agreed to abandon it where strategical reasons compelled this to be done. In the one case as in the other, the Berlin Treaty was carried out. The watershed, the crest, and the slopes formed part of the chain called the main chain in the Treaty, and known beforehand as such.

The Argentine Republic does not swerve from this rule. She is acquainted

with the main chain of the Andes. The general direction which it takes from north to south, the height of its peaks, the snows which crown them, the geological structure, the general continuity, all the data which carry to the mind the persuasion of truth, mark it as the main chain with its typical features. Within this chain should be sought the division of its own waters, in its highest crests, as the Treaties state. A river which rises on its eastern slope, or in an isolated mountain, or in separated hills, and which after a lengthy course traverses the Cordillera, does not lead one to consider the distant plain, the solitary mountain, or the detached hill, as a chain of mountains, and far less as the main chain of so gigantic a Cordillera as that of the Andes.

The Representative of Chile may, perhaps, cite some writers who call "main chain" one which divides the waters, and even all the waters, wherever the division is produced on the crest; but he will not find one single writer who bestows the name of "main chain" upon the division of rivers which, originating outside the range, cross it in their course.

Whilst, on the one hand, the views of the Constantinople Commissioners corroborate the opinion of those who think that the *divortium aquarum* of a chain is the *divortium aquarum* of its crest, on the other hand it is easy to see that Chile could never quote those views in order to support the opinions of her Expert. The Great Balkan, from Demir Kapu to Kosika, is not cut by any stream whatever, while the Andes, in the Patagonian region, are traversed by several rivers. In order that quotations as to what happens in other quarters of the globe should apply to the Andean Cordillera, it is necessary that the circumstances be similar. Instead, therefore, of referring to the Great Balkan, which not a single river cuts, reference should be made to the Carpathians, to the Transylvanian Alps, where several rivers and streams, and especially the Aluta, make breaches across it. It is there that inquiry should be made as to whether any geographer opines that the main chain of the Carpathians is not to be found in the Carpathians themselves, but in the winding line which runs amongst the sources of the rivers; search should there be made whether any geographer asserts that the *divortium aquarum* of the Carpathians quits its ridge and penetrates into the heart of Transylvania.

Neither statesmen nor scientific men in Europe have ever stated such an error. The political boundary between Transylvania and Roumania crosses the rivers that cut the Carpathians. The geographical boundary, likewise, is indicated by that mountain barrier. Notwithstanding the breaches in it, no geographer has pretended that its main chain is subordinated to the Aluta or the Schyl. It is in

the succession of the most elevated crests, that divide their own waters, that the Transylvanian chain has been located, without any one having thought that other waters and divisions of waters would give their name to the mountains.

The words "main chain" do not, therefore, convey the idea of a water-parting line, both because a chain is never a line, and because if, in order to be the main one, it were required that it should follow the sources of the streams, the curious result would ensue of a chain ceasing to be a chain. Everybody knows, as a matter of fact, the import of this word in geography; everyone knows that it means a succession of mountains, and it, in consequence, cannot be considered as a line running amidst the sources of the Patagonian streams, along all kinds of inequalities, heights, depressions, peaks, valleys, hills, rising grounds, and extensive plains. Such a line might be given any name, but could not be called Cordillera, nor chain, either "main" or "secondary."

Even on the hypothesis of leaving all these considerations aside, it would be necessary to remember that the expression "main chain" was used for the purpose of discarding hydrographical hermeneutics in the Protocol of 1893, negotiated with the object of condemning for ever the theory of the South American *divortium aquarum*. This Protocol records the possibility of "parts of rivers," existing on one side or the other of the frontier, and this fact would of itself suffice to show that it is impossible to consider as "principal chain" that which is neither "principal" nor "chain"; besides, the strictly orographic expression does away with the conception of hydrographical basins situated in the Pampa.

There is no need to insist upon the fact that the "principal chain" is an orographic feature, and that therefore nothing hinders its being crossed by rivers. It may be recalled, however, that authors point out the clear difference between "main chain" and division of continental waters; that Vivien de St. Martin, in his new Dictionary of Universal Geography, states that the river Aroun, for example, opens itself "a passage between the massifs of the *principal chain of the Himalayas*"; that in the Proceedings of the Royal Geographical Society occurs this passage, which distinguishes, as should be the case, the main ridge from the rivers: "Thus while the Limay, a tributary of the Rio Negro, flowing into the Atlantic, rises on the west of the *main ridge* (which is not exact), numerous Pacific streams rise on the east;"* that Lapparent has

* Vol. 9, 1887, p. 580.

written : "The 'ensemble' of these points will form the '*dividing line*.' But it would be a great mistake to suppose that such lines can always be mathematically defined. It would be a still greater mistake to imagine that they must in every case show themselves prominently (*s'accuser franchement*) in topography, and that the chief accidental features of the relief will coincide in a constant manner with the limits of the great hydrographic basins ;" * that the Scottish Geographical Magazine records this paragraph : "From Serrano's second trip, and from an investigation conducted by the Government of Chile, the remarkable fact has been ascertained that the water-parting between the Atlantic and the Pacific slopes in those regions is not coincident with the *main chain* of the Andes, but it is a plateau lying to the east of it, and having an altitude of some 1640 feet ;" † that Sir Martin Conway stated not long since in a lecture upon the Bolivian Andes : "South of the great gap by which the La Paz river traverses the ancient watershed, the *main range* is continued though at a much lower altitude ;" ‡ that the German geographer Dr. Steffen, in the service of Chile as a member of her boundary Commissions, although bent upon demonstrating that the frontier runs along the continental divide, reserves the name of "principal chain" (*encadenamiento principal*) for the one which is so in reality, and calls the other "the chain that divides the waters," in the following paragraph : "To the north of this basin continues the said chain of high peaks, with an approximately southern trend, and it appears as a series of imposing snow-covered masses upon which glaciers are formed ; this series is broken by deep gorges, but it constitutes as a whole a continuous central chain, which may be recognised, if one chooses to call it so, as the *principal chain of the Cordillera*." He afterwards says, it is true, that it does not divide the continental waters ; but it is also true that Article 2 of the Protocol of 1893 has stated that the sovereignty of each country extends as far as the principal chain, without specifying whether the latter divides the waters or not, and still less the continental waters. On the other hand, Dr. Steffen adds : "There are therefore solid reasons for doubting the existence, within this zone, of transversal valleys ; there probably exist here, as in the Upper Puelo and in the Palena, broad and fertile valleys between the *principal chain and the dividing of the waters*." §

* Leçons de Géographie Physique, Paris, 1898, p. 11.

† Vol. 3, 1887, p. 488.

‡ Geographical Journal, vol. 14, July 1899, p. 19.

§ Zeitschrift der Gesellschaft für Erdkunde zu Berlin, vol. 32, 1897, No. 1.

It may also be borne in mind that the Chilian geographer San Roman accepts the difference between "the *main chain* of the Himalaya," and the "water-divide line"; that Baines has written: "Of these rivers, two main streams and two affluents take their rise to the north of the Himalaya, and all four, strangely enough, from within a comparatively small lacustrine district between the *main range* of the Himalaya and the tableland of Tibet;"* that Sir Clements R. Markham says: "Their drainage generally finds its way to the Pacific, but in four places rivers force their way through the *main eastern chain* and join the Amazon;"† and that Dr. Siemiradzki, to whom the Chilian Representative attributes a full knowledge of the orography of the country, says: "In Patagonia the Cordillera is low, and particularly the passes of the Cordillera are very low, since the water-parting is, in most cases, situated outside the *main Cordillera, in Argentine territory.*"‡

These quotations conclusively prove, if such proofs were necessary, that the main chain spoken of in the Argentine-Chilian Treaties, and the continental divide of which no mention is found in them, are two quite different features.

3. THE WORK OF DEMARCATION.

The Chilian Representative devotes a paragraph of his Statement to studying "the work of the demarcation in accordance with the Treaties."

He commences by examining the wording of the Records drawn up by the Sub-Commissions of assistants, and he finds that some of these Records recognise that the "main chain" of the Cordillera de los Andes is that which divides the waters flowing to the Argentine Republic on the east and to Chile on the west, and that some others "continued to respect the principle of the water-parting line," which the Protocol of 1893 proclaimed to be "the geographical condition of the demarcation."

He goes on to say that "the geographical condition of the demarcation" has been followed for a considerable extension on the line, and that in tracing it, "in no part has a river been crossed, nor a stream, nor even a spring." He afterwards inserts a table, by which he tries to demonstrate that the line leaves

* The International Geography, London, 1899, p. 470.

† Ibid., p. 829.

‡ Anales de la Universidad de Chile, vol. 85, p. 152.

on both sides of it elevations much greater than those which it passes through, and he ends with this paragraph taken from Señor Barros Arana :—

“ All the points upon which the Experts are in accord, and which constitute the greater part of the tracing of the boundary line, are situated on the water-parting line, invariably respecting this geographical condition of the demarcation. At the time of fixing these points, the summits or peaks of greater height than the boundary line, which rise to one side and the other of it, had not been taken into consideration ; neither had there been taken into account the lateral chain of mountains which are broader, steeper and higher, that rise to the east of the chain upon which the frontier line is made to pass, because such lateral chains do not divide the waters. Such was the manner in which the stipulations of the Boundary Treaty were carried out, and such was the interpretation which in the practical application was given to the words ‘ main chain of the Cordillera.’ ”

The whole of this paragraph synthesizes the errors into which the Chilean Representative has fallen in the course of his Statement. It is a compendium of the arguments which have already been refuted in detail.

During the whole of the boundary dispute, the Argentine Republic has revealed a constant decision to set aside the doctrine of the continental water-divide as inconsistent with the Covenants. After the Treaty of 1881 had been in force for many years the Chilean Government in its official documents had interpreted it in its correct sense, repeating that the boundary was constituted by the “ *Cordillera nevada*,” the “ *crest of the Cordillera*,” the “ *summit of the Cordillera*,” the “ *anticlinal line of the Andes*,” the “ *culminating line of the Andes*,” the “ *upper ridge of the Cordillera*.” Nevertheless the Chilean Expert manifested his views which tended to remove the boundary from the said “ *Cordillera nevada*,” from the said “ *crest*,” from the said “ *summit*,” from the said “ *anticlinal line*” and from the said “ *culminating line*,” in order to follow as a paramount principle, that of the hydrographic basins. From the very first moment he did so, the constant resolution of the Argentine Government, as clearly shown in hundreds of acts and communications, was to rejecting the said doctrine. Their Ministers, their Experts, have expressed themselves in this sense unanimously and without hesitation. It is not possible, then, to suppose that the Argentine demarcators, to whom the Chilean Representative refers, would have put aside those antecedents when marking out the boundary and when setting forth their proceedings in the Minutes.

The Chilean Representative has drawn erroneous consequences based on a simple coincidence, already alluded to. Along a considerable extent the main chain of the Andes forms a wall in which the work of the waters has failed to make a breach. In that extent it may be properly said that the South American

divide coincides with the line of the most elevated crests of the Cordillera de los Andes, which the Treaties order to be followed. In that distance the boundary has been traced by common consent, it is true, but in pursuance of different standards of opinion : the Chilian Expert has proposed it because he thought that therein was the interoceanic divide ; the Argentine Experts have upheld it because they have found therein the Cordillera de los Andes and its main chain. The Chilian Representative disregards the reasons which actuated the Argentine Experts and takes advantage of the physical fact of the coincidence to argue that the division of the continental waters has been followed as a standard.

For the same reason, availing herself of the same arguments, the Argentine Republic might affirm that the Chilian Expert has respected the Cordillera de los Andes and its most elevated crests in the course of the dividing line, at those points in which the opinions of both Experts have coincided, and could put forward the inconsistency of the Chilian Expert's views, who along an extension of fifteen degrees accepts the line of high summits, and along ten other degrees, carries the line down to the marshes and swamps of the Patagonian plains.

With the exception of the case of the Bio-Bio, which has been already explained, the main Cordillera de los Andes, regarded as such by reason of its heights and by reason of its orographic constitution, does not appear to be cut by any stream from Mount Tres Cruces up to Mount Perihueico. How was it possible then that any rivers should be cut by the Argentine Experts in tracing the line ? The Chilian Expert, on his part, has not abandoned the orography, the dominant chain, or the Cordillera de los Andes from Mount Tres Cruces to Mount Perihueico, to go and search for the sources of the streams in valleys and in plains.

It is, at least, a misconception to compare what occurs from Mount Perihueico to the north with what occurs from Mount Perihueico to the south. On the north, the continental divide coincides with the elevated crest prescribed by the Treaties. It is therefore immaterial whether the former or the latter be followed as far as regards the consequences of the demarcation. On the south, where rivers taking their rise in the Pampas cross the chain through its deep gaps, the continental divide abandons the Andean range, and under these circumstances the line referred to in the Treaties must leave in each country the parts of the rivers which it may cut.

The argument of the Chilian Representative appears still more groundless if it is borne in mind that the Argentine Expert, in the Records of August and September 1898, already examined, expressed the views which guided him when proposing his frontier line. If the boundary thus conceived and applied coincided

with the water-divide, can it be said and maintained that the continental divide, expressly repudiated by him, is the one which was uppermost in his mind, and that the views he recorded signify nothing ?

The Argentine Expert was, and is, thoroughly convinced that some rivers cut through the main chain and even the Cordillera de los Andés, and that some others take their rise in it. It is impossible to pretend that since his proposed line does not cut the latter rivers, it ought, for the sake of consistency, be traced along the head springs of the former.

But the arguments of the Chilian Representative become even weaker when they are analysed in detail, as will be seen later on.

The Records of the Sub-Commissions of assistants, even if they mentioned explicitly the interoceanic divide, would prove nothing : Firstly : because the assistants, by the fact of placing a landmark, were powerless to abrogate the international Conventions ; Secondly : because the work of the assistants was not final. In order to be binding it required the subsequent approval of the Experts, and such approval should only refer to the landmark itself and nothing but the landmark, totally disregarding the reasons alleged by one side or the other. It will be remembered that when Señor Quirno Costa was the Argentine Expert, his colleague, Señor Barros Arana, addressed to him a note on August 6, 1894, in which he acknowledged that the final approval of the Records was a prerogative exclusively belonging to the Experts ; and further, stated that the approval should be expressly extended to the " contents of the Records signed by the assistants." Señor Quirno Costa refused to accept the proposal, " because, as he said in his note of October 29, it would not add a single element to the validity of the demarcation ; it would create difficulties for the Experts themselves, as it would be very likely that they might be in accord as to the placing of a landmark, but be in disagreement as to the statements which the assistants of one Sub-Commission or the other might respectively make in the documents ;" Thirdly : because the landmarks placed at Las Damas, Santa Elena, Reigolil, Colocó, Las Leñas and Molina, referred to by the Chilian Representative, while they are in accordance with the Treaties, coincide, though accidentally, with the continental divide. The mention which might have been made in the Minutes of this divide could never warrant the presumption that it was intended to abandon the Treaties. It is not in those parts where the main chain of the Andes presents the peculiarity of dividing continental waters that arguments may be sought for the purpose of afterwards applying them to regions which do not present the same peculiarity.

But besides all this, the Records do not lend themselves to the interpretation which the Chilian Representative erroneously applies to them. On the contrary, no word will be found in them alluding directly or indirectly to the continental divide. The one quoted—probably because it is regarded as the most favourable to his contention—runs as follows :—

“The undersigned chiefs and assistants of the respective Sub-Commissions of the central section on the part of Chile and the Argentine Republic, assembled on the Cordillera de los Andes on the date of March 8, 1894, and having in view the Instructions imparted to them by both Experts on the date of January 1 last, as well as the stipulations of the Treaty of 1881 and Protocol of 1893 therein mentioned, have agreed to erect a landmark on the point of the main chain of the Andes which divide the waters, commonly called Paso de las Damas, a point that serves as a means of communication between the Chilian Valley of Tinguiririca and the Argentine river Tordillo. In conformity with Article 7 of our Instructions, we record in this minute that at the mentioned Paso de las Damas two streams diverge, the western one flowing into the valley of the same name, and becoming an affluent of the Chilian river Tinguiririca, and the eastern one to the stream named La Linea, which, joining with that of Las Choicas, form lower down the Argentine river Tordillo.”

These words do not involve any reference to the continental divide. The Sub-Commissions met on the *Cordillera de los Andes*, and on the Cordillera de los Andes was found the Paso de las Damas as the Record itself stated.* This single fact, which is paramount in the document, is sufficient to show that it is impossible to properly apply it to the regions outside that Cordillera, where some rivers which are tributaries of the Pacific take their rise. Moreover the assistants stated that they sought for the main chain, and in it they selected a point named Paso de las Damas which divides the waters. This was the correct procedure to be followed. The first, the most important thing, is the determination of the Cordillera de los Andes properly so-called ; then its main chain ; lastly, in that main chain, the uppermost line where the waters thereof divide. This was, as it has been seen, the procedure specified in those Instructions of January 1, 1894, † which the Record itself quotes and which had to be complied with.

The Chilian Representative, nevertheless, thinks that the words of the Record prove that it was recognised that the main chain of the Cordillera de los Andes

* The Record says: “Bearing in mind the great difficulties of transport in moving the iron castings which constitute the definite landmarks to this point of the *Cordillera*, we have agreed to erect a provisional stone landmark, which shall remain as a sign of demarcation until the Experts come to some further determination.”

† See p. 307.

is that which divides the waters that flow to the Argentine Republic on the east and to Chile on the west. The Sub-Commissions who drew it up could not have thought so, particularly as before tracing out the line they were not in a position to know what rivers or parts of rivers in the Cordillera de los Andes were Chilean and what rivers or parts of rivers were Argentine.

The Chilean Representative was doubtless influenced by the phrase "the main chain of the Andes which divide the waters," and by the mention made of some streams which the Paso de las Damas separates. As to the former, it may be remembered that the Chilean Representative admitted before the Tribunal something which is demonstrated by the most trivial observation, viz. that in each chain there is a dividing line of its own waters. It is not at all strange, therefore, that the Record should specify the fact of the local divide effected on the crests, and especially seeing that the boundary line cannot pass over any part whatever of the chain—over its sides for instance—but over the topmost ridge, from whence the waters descend by the two slopes of the chain.

Moreover, the Record does not say that the main chain divides the waters, though it could have done it; it says that the Paso de las Damas is in the main chain and that it also divides the waters, thereby signifying that it is situated on its ridge. It is not the main chain of the Andes which divide the waters according to the Minute. The Sub-Commissions agreed to plant a landmark on the point of the main chain of the Andes which divide the waters commonly called Paso de las Damas. That point—which is not a mathematical point but a superface—is that which is found situated in the main chain of the Andes; is that which divides the waters of that chain since it cannot divide those of any other chain; and it is that which is called Paso de las Damas, as also that which "serves as a means of communication," according to the Record "between the Chilean valley of Tinguiririca and the Argentine river Tordillo." The landmark was planted on that place between the division of waters because the ground allowed of it. A similar Record could not have been drawn up, when placing the landmark at Maipu Pass, immediately to the north, because in its vicinity there does not exist a permanent division of waters, notwithstanding that that point is situated on the line of the main chain, which there coincides with the continental *divortium aquarum*.

This construction appears clearer when we read the second paragraph quoted by the Chilean Representative :—

"At the mentioned Paso de las Damas two streams diverge, the western one flowing into the valley of the same name, and becoming an affluent of the Chilean river

Tinguiririca, and the eastern one to the stream named La Linea, which, joining with that of Las Choicas, form lower down the Argentine river Tordillo."

The existence of these streams should be mentioned in the Record, in compliance with the stipulations of the Treaties, inasmuch as, once the line is marked out, and only then, is it possible to ascertain which streams must be recognised as Argentine, and which must be considered as Chilian. The reference does not involve any presumption in regard to the continental or interoceanic divide. Far from it. The Commissions took note of the existence of the streams, but did not deal in the slightest degree with the subsequent course they follow; the assistants did not inquire whether they empty into oceans, or whether they percolate the soil and disappear after a course of a few miles; the Commissions did not investigate whether those streams have any connection with any of the American fluvial systems; they did not stop to consider whether the watercourses after descending from Paso de las Damas, now converted into rivers, change their course and penetrate the chain, or whether they do not change it; nor did they even ascertain that the waters of the river Tordillo, affluent of the river Atuel, do not flow to any ocean, and that therefore, according to the theory of the Chilian Expert, neither the former nor the latter are rivers, but "parts of rivers." All this, which would have been essential for the carrying out of the continental divide, was omitted by the Commissions, and was properly omitted, as they were instructed that the visible course of the rivers when descending to the neighbouring valleys is not actually necessary in the demarcation of the frontier (Protocol 1893, Article 7).

The Records therefore reveal the very reverse of what the Chilian Representative thinks. They show that the Commissions did not pay the slightest attention to the South American divide. In order to carry this theory into effect, it would have been necessary to investigate whether the waters which descend from Paso de las Damas were not intersected further on by the chain in which that Paso is situated, and whether those waters formed part of the tributary fluvial system of both oceans, etc. Was anything of this kind done? The Records contain nothing on this point.

The Chilian Representative sets forth that the tenor of the Record was modified later by the Argentine Commissions. The new wording, however, answers the same purpose: the strict compliance with the Treaties and with the Instructions signed by the two Experts, ordaining that the Sub-Commissions shall work in the Cordillera de los Andes, and adding, in Article 5:—

“ Said Sub-Commissions shall investigate the situation, in said Cordillera, of the main chain of the Andes, in order to seek, in same, the most elevated crests that may divide the waters, and shall mark the frontier line on their accessible parts, making it pass between the slopes which descend one side and the other.”

The Chilian Representative, speaking of other Records, says :—

“ In both cases a Record was made of the streams or springs that flow down on each side from the point in question, thus acknowledging that, in spite of the new form of the minute, it continued to respect the principle of the water-parting line, which the Protocol of 1893 proclaimed to be the geographical condition of the demarcation.”

In fact, the Cordillera de los Andes being determined and its main chain therein also determined, the Argentine Commissions sought in that chain for the line where its waters divide, without concerning themselves with the subsequent course of the rivers or with the question whether the latter did or did not perforate the chain.

4. SUPPOSED ADVANTAGES OF THE CONTINENTAL DIVIDE.

The Chilian Representative enters into lengthy considerations to show the advantages arising from the boundary being demarcated according to the theory of the continental divide, although he commences by pointing out that the existence or non-existence of such advantages is immaterial to the present controversy, since in order to settle it the rule laid down in the Conventions must be strictly applied.

The Treaties have, in fact, bound the will of the Argentine Republic and of Chile, and the solution of the differences is to be found in the strict observance thereof. The aim of the Treaties was to raise an orographic wall between the two countries, and that wall must be respected, however inconvenient it might be found as a boundary, though no attempt has been made to prove it to be so, nor could it ever be proved if it were attempted.

In studying those alleged advantages, the Chilian Representative has not considered the matter from its proper point of view, for he has not compared the advantages which result from a frontier marked out in accordance with the rules of the continental divide with the advantages derived from the adoption of the main and most important chain of a Cordillera. In order to decide in favour of one or other of these boundaries, in theory, it would be indispensable to compare side by side their reciprocal conveniences or inconveniences.

This course has not been followed by the Chilian Representative. He contends that the line of the continental divide is a good boundary between two Nations ; but that does not preclude the actual or possible existence of another much better line, according to the special circumstances in each case.

From the study of the Chilian statement as a whole, and from the quotations therein made, it appears that the advantages attributed to the water-divide are six, namely, (1) FACILITY IN MARKING IT OUT ; (2) IT IS A NATURAL BOUNDARY ; (3) IT IS PERMANENT ; (4) IT IS STRATEGICAL ; (5) IT HAS BEEN USED BY SOME NATIONS ; (6) IT ALWAYS MAINTAINS IN ITS COURSE A MORE UNIFORM AVERAGE HEIGHT.

1. *Facility in marking it out.*—When the watershed is on the crest of a mountain chain, this facility is oftentimes undoubted. The rain waters or melted snows descend from the high summits, flowing down the opposite slopes, and as a rule it is not difficult to locate its *divortium*. In the case of the Andes, once the Cordillera is determined, and once the main chain within it, which presents the most salient feature in the country, is specified, there is not always a great difficulty in finding the peculiar general watershed of that chain.

But it is desirable to remark that even when dealing with that watershed, even when dealing with the most elevated crests, it is not uncommon to meet with those obstacles which the boundary Treaties have anticipated by ordering the Experts to report thereon and prepare plans of the geographical features.

If, instead of the natural watershed of the most elevated crests, any other divide is considered—as, for instance, the continental divide—the difficulties would increase. This is what Lapparent has pointed out in a paragraph already quoted (p. 440), and what a competent geographer has lately said :—

“ There the watershed would be a most undesirable frontier, and in countries in which the main rivers rise on flat elevated plateaux or in low ground, it often becomes almost impossible to determine on the ground the exact line of water-parting.” *

But this is not all. In opposition to the opinions expressed before the Tribunal by the Chilian Representative, there may be cited the views of the Chilian Expert Señor Barros Arana, and those of the chief of the technical staff of the Chilian Commissions, Señor Bertrand, neither of whom hesitated to recognise the difficulty of marking out the water-divide in some regions outside the mountains.

* The Geographical Journal, vol. 13, No. 5, May 1899, p. 479.

The former, in his note to the Argentine Expert, of January 18, 1892, said :—

“In regard to this I will restrict myself to stating that the document quoted refers solely and explicitly to that part of the Atacama Desert where there exists a real and actual line of high crests which separated Chile from the high tableland or Puna Boliviana de Atacama, a region in which there is a *complicated ramification of the divortium aquarum*; so that by way of exception, in that place where the waters of the high tableland do not empty into the ocean, it was considered safer to designate the high summits, which presented no ambiguity and consecrated the traditional limit.”

In the Record of August 29, 1898, the Chilian Expert recognised the necessity of conducting topographical operations for “determining which would be the course of the waters where they do not actually flow.”

The following paragraphs connected with the region in the neighbourhood of parallel 52 may be quoted from Señor Bertrand :—

“The point, *necessarily somewhat indefinite*, owing to the plain and marsh of this region, at which the *divortia aquarum* crosses the parallel, is to be found at the northern foot of a wooded mountain crowned with volcanic rocks, and which terminates on the south in the ‘Penitente’ ridge, and the approximate situation of the said intersection must be at meridian of 72°, very near the coast of the channels, approaching, according to our investigations in Disappointment Bay, to within ten miles of the meridian named. . . . The Pampa is an undulating ground, and there being no permanent watercourses, *it is difficult to determine a line marking the greatest elevations of the ground*; the two channels (cañadones) of the Fierro (Butterfly River), and the Condor (Duck River), are rather a succession of small lagoons, and their sources *are somewhat undefined*. In order to mark out this portion of the boundary on the ground, it would be necessary to utilise the level, unless some preliminary arrangement by the Governments should indicate the courses of the lines, in order to avoid *costly operations* on lands of such slight value and limited extent.” *

Señor Gaspar Toro, who was Secretary to the Chilian Legation in Buenos Aires, wrote a book in defence of the proceedings of Señor Barros Arana, the Minister, with whose ideas he must have been thoroughly acquainted. In this book we read :—

“The great Cordillera de los Andes, which runs through all America, comes down uninterrupted as far as Llanquihue, on the northern boundary of Patagonia. In its prolongation towards the south it is intersected and disappears in some places, and in others it opens out and splits into branches which stretch out their spurs far into the

* Memoria sobre la Region Central de las Tierras Magallánicas, 1886, Santiago, pp. 134 and 135.

interior of Patagonia, or else hide their bases in the Pacific, their crests forming the islands of the coast. There, any anticlinal line or *divortia aquarum* seems to be effaced, the waters flow in every direction through large valleys, considerable lakes, high and vast tablelands, until they empty themselves, some into the Pacific and others into the Atlantic." *

These quotations show that the first advantage attributed by the Chilian Representative to the continental divide is to some extent imaginary. It is not always easy of being marked out on the ground, and sometimes the difficulty of doing so in Patagonia is very considerable. On the contrary, the crests of the Cordillera de los Andes are always easy to be determined.

2. *It is a natural boundary.*—The continental water-divide is doubtless a natural boundary, and it may be said that only from this point of view it offers advantages in some cases over artificial boundaries ; but it is not a question of comparing it with a boundary of this latter description, but with another boundary equally natural, and safer, as well as more immovable, more permanent and more majestic, such as the main chain of the Cordillera de los Andes.

3. *It is permanent.*—Further on it will be seen that in the regions of Patagonia the permanency referred to is almost illusory, but even were it not so, it would never be possible to compare in point of stability, the line traced along headsprings of rivers rising in flat ground, with the line which runs over masses whose general conformation human action is powerless to alter.

4. *It is strategical.*—Probably the Chilian Representative did not intend to use this argument, though the truth is that in some words which he has quoted this consideration does appear, and it is very important when dealing with water-divides occurring on the topmost crests of the mountain chains, but totally inapplicable when dealing with the interoceanic divide in Patagonia.

Moreover, if the Chilian Representative did not intend to consider the controversy from its strategical point of view, he would have fallen into an omission which the Argentine Republic considers it desirable to make good.

Among the manifold features which contributed to point out the Cordillera de los Andes as the dividing wall, its strategical conditions were put forward by Chilian statesmen and military authorities, who recognised in the Andean crest a natural fortification of the first importance which it was not prudent to abandon. It suffices to recall the words of Señor Amunátegui : "The Andes, that colossal

* La Diplomacia Chileno-Argentina, Santiago, 1878, p. 10.

bulwark with which God has protected our country on the east"; of the Chilian General Mackenna: "Nature has given to Chile in the majestic range of the Andes a natural fortification, one which, from its great extent, is unique in the world"; of the Chilian General Aldunate: "This country is enclosed on all sides by impregnable barriers"; of the Chilian writer Señor Renjifo: "The territory of the Republic being circumscribed by eternal boundaries which separate it from the rest of the continent, we do not run the risk of seeing ourselves engaged in boundary wars, nor in our political plans can any ambitious expectation find favour such as would alarm adjoining provinces."

Now, as the Commission which will survey the ground on behalf of the Arbitrator will have occasion to verify, the boundary line proposed by the Chilian Expert in the points and stretches where the differences submitted to the arbitration of Her Majesty's Government have arisen, encloses regions which, being an uninterrupted continuation of the Argentine territory eastwards of the line of ice, are always very difficult to reach from the west, and in some parts absolutely cut off most of the year by snow and torrents.

Besides, this fact was recognised before the Tribunal by the Chilian Representative at the sitting of May 11, 1899, which renders any further development needless.*

What strategical condition does such a boundary offer?

With the continental water-divide as a standard, Chile might have incorporated into her dominions both slopes of the Cordillera de los Andes, and penetrated into the heart of Patagonia in Argentine territory. The equilibrium of reciprocal defence would have been upset by this means. Chile would have continued to be protected by her mountains, and she would have encroached upon her neighbour's plains in a way that would be most difficult to define.

On flat ground dividing lines are easily erased, and it is only by means of artificial landmarks that the respective jurisdiction can be recognised, especially if there are no watercourses; it is not in such a place that a strategical boundary would be marked out, when many miles to the west there stand mountains whose excellence as a military barrier Chilian statesmen have been the first to avow.

For the reciprocal defence of both states, Nature has placed between them the main chain of the Andes as an insuperable bulwark. The Treaties, faithful to the observance of the counsels of Nature, have set them down in their clauses,

* Fourth meeting, p. 7.

and the Argentine Republic, faithful to the observance of the Treaties, claims for their application on the ground.

5. *It has been applied by some nations.*—On this point the Chilian Representative falls into some confusion. The continental water-divide, as sustained by the Chilian Representative, was never applied as a rule of delimitation. The cases mentioned by him, and in which the boundary in some few, and very few, occasions has followed the headsprings of the rivers, bear no relation or similitude to the proposed line of the Chilian Expert. In none of them is to be discovered the existence of rivers which flow through the mountains, in none of them have the mountains been set aside for the purpose of seeking for sources. All this is proved by a perusal of the instances quoted.

(a) *Treaty of Versailles of February 26, 1871.*—It is true that as a result of the incorporation of Alsace and part of Lorraine into Germany, the Franco-German boundary along the Vosges runs, for about one geographical degree, without intersecting any river; but it is also true that there is no river which passes through the Vosges. Here, the watershed of the most elevated crests of the Vosges has been followed,* and this crest is none the less the most elevated, though *some isolated peaks* rise on one side or the other. Besides, this instance cannot be compared to the case of the Cordillera de los Andes, which is traversed from one side to the other by rivers that rise on the opposite slope and even in the plain.

(b) *Treaty of Berlin.*—The Chilian Representative says :—

“In the International Congress which met in Berlin during the months of June and July, 1878, the boundaries of Turkey and of the Danubian Principalities were settled, as has already been mentioned, upon the principles of the water-parting line (*partage des eaux*) in the places where the frontiers ran over mountains.”

However, the truth is, that the Treaty of Berlin, if it proves anything, proves that in order to mark out correct boundaries between countries, it is permissible to intersect the rivers encountered along the route. Article 2, which marks the confines of Bulgaria, provides that amongst others, the rivers and streams Deli Ramcik, Ichtiman Dere, Struma, Sukowa, etc., are to be intersected. Article 28, referring to Montenegro, orders the streams Piva, Lim, etc., to be

* In the Treaty the following sentences occur : “Pour suivre *la crête* des montagnes entre la Seille et la Mousel” is the wording in one place; and “*la crête* des montagnes entre les sources de la Sarre Blanche et la Vezouze” is the wording in another place. The *crest* of mountains cannot be considered as a water-parting in flat lands.

intersected. Article 36, referring to Servia, provides that the Sukowa and the Morawa shall be cut, although the boundary partly runs between the affluents of these rivers. Article 58 marks out the Russo-Turkish Boundary in Asia, intersecting the river Tchorouk.

The Treaty of Berlin also indicates the boundary in some cases by the local watershed, and in others by the main chain of a mountain system or by the crest of that system. Rivers are intersected whether there are chains or not, and it is even specified, in the minutes of the demarcators, that the chains adopted as a boundary do not coincide with the water-parting.

It would be tedious to detail the many instances that might be quoted to corroborate these statements, yet a few references may not be superfluous.

The southern boundary of Bulgaria, before crossing the river Déli-Kamtchik, was drawn over the crest of Pilav-Tépé. After intersecting the river, the line runs up to the crest of the Kapi-Baïr. That is to say, therefore, that the line runs through mountains, but when it encounters a river it intersects it. The Expert work approved by the Constantinople Commissioners, at the session of July 29, 1879, in the paragraph referring to this matter, says :—

“ La frontière se prolonge ensuite par une suite de ravins et de cols orientés dans une direction générale du sud-sud-est au nord-nord-ouest, entre le Balaban-Déré et le Délédji-Déré, jusqu’au pied du Pilav-Tépé ; elle monte, toujours dans la même direction, sur *le sommet* de cette montagne, elle en suit *la crête* et redescend directement au Déli-Kamtchik, qu’elle *coupe* en un point situé à 2850 mètres en amont et à l’ouest de Tchengi, à 1825 mètres en aval et au nord-est de Hadji-Mahalé. Le village de Belibe et les ruines de Kemhalik restent ainsi à la Bulgarie, les villages de Tchovankioj, Kaïrak-Mahalé, et Kosik, à la Roumélie Orientale. De la rive gauche du Déli-Kamtchik, et par *l’arête* rocheuse qui aboutit au point indiqué précédemment, la frontière monte sur *la crête* du Kapi-Baïr.”

In another section of the demarcation, approved on October 6, 1879, it is stated :—

“ La frontière, *quittant en ce point la ligne de partage des eaux*, gagne en ligne droite *le sommet* d’Ouzoum-Baïr ; puis elle atteint, en suivant le prolongement de cette ligne, le débouché d’un ravin sur la rive droite de la Toundja à Dokolianka-Baïr. Le point où elle *coupe la Toundja* est situé à 1200 mètres environ et en aval d’un gué connu des gens du pays sous le nom de Dokolianka-Guetchit.”

In another section, approved on October 22, 1879, we read :—

“ Elle gagne ensuite *le sommet* de Djibraïl-Tépé, au sud de Tchépéli-Dagh ; puis ceux de Tcherná-Gora, Karadja-Evress, Kotlitzá, Echék-Koulagh, Touzla-Tépé et Kouzu-Yataghi. De là elle atteint le col de Mézar-Guédik, puis la hauteur de Tchuruk-Tépé et celle de

Perlik-Tépé, où la chaîne du Karlik-Dagh se détache de la ligne de partage ; gagne les sommets de Moussa-Yataklar et de Kartal-Kaya et arrive à un point de la crête qui est l'origine commune de trois bassins, savoir : celui de la Maritza au nord, celui de l'Arda au sud-est, et celui du Mesta-Karasou au sud-ouest."

By reference to the same section it may be seen later on that it was agreed as follows :—

" Arrivée en ce point (Kaïntchal-Tépé), elle s'infléchit vers le nord ; gagne le sommet de Kartal-Tépé où la chaîne du Kaïntchal-Kartal-Dagh se détache de la ligne de partage ; suit les crêtes de Kouzou-Yataghi, atteint successivement les hauteurs de Keur-Issa, Avliko, Erdjekli, Tchaïrli-Yaïlassi, et après avoir suivi les crêtes de Chahin-Kiran, gagne les points culminants de Gueuz-Tépé et de Tchali-Yaïlassi Sirtlari, puis le col d'El-Guédik et les hauteurs de Véternitza et de Kara-Mahmoud, le village de Jilandji restant à la Turquie." *

Therefore, it was only by an error that the Chilian Representative could have stated that the boundaries were settled, by the Treaty of Berlin, upon the principles of the water-parting line, when the frontier ran over mountains.

It is also well known that even in those places where the watershed was followed as a rule, regard for military considerations in the demarcation of the ground caused this watershed to be abandoned at several parts. Moreover, the mention of the Treaty of Berlin could never serve as an argument in favour of the continental divide in Patagonia. To establish any similarity, it would be necessary that a dividing line should be stipulated along a chain, that the chain should be broken by a river, and that, notwithstanding, the demarcators should have abandoned the chain in order to seek for the source. A case like this does not occur either in the Treaty of Berlin or in any other known Treaty.

(c) *Brazil-Venezuela Case.*—This is simply an instance showing that there are cases in which the division of rivers coincides with the crest of a chain. Besides, in the Treaty it was clearly agreed that the line should pass over the headsprings of the rivers. This being so, it is obvious that it does not apply either directly or indirectly to the present controversy, in which such a clause does not appear ; and far from this, it has been expressly laid down that "parts of rivers" may belong to either country, when the dividing Cordillera de los Andes is cut by rivers taking their rise in places at a great distance from it. It will suffice to peruse the Treaty in order to be thoroughly convinced of this. In the portion relating thereto, it says :—

* Turkey, No. 2 (1880). Further correspondence respecting the European Commissions appointed for the demarcation of frontiers under the Treaty of Berlin, London 1880, pp. 242, 408, 466.

"It shall proceed from the summit of the mountain Parima to the angle which it forms with that of Paracaima, so that all the waters which flow to the Rio Blanco shall remain belonging to Brazil, and those that flow to the Orinoco, to Venezuela; and the line shall continue on the most elevated points of the said mountain ridge of Paracaima, so that the waters running to the Rio Blanco shall remain belonging, as stated, to Brazil; and those which flow to the Essequibo, Cuyuni and Caroni to Venezuela, up to the point to which the territory of the two states extend in their eastern part."*

(d) *Treaty of May 12, 1894, agreed upon between Her Britannic Majesty's Government and the King of the Belgians as Sovereign of the Independent State of the Congo.*—The Chilian Representative says:—

"By this Treaty it was established that the boundary between that State and the British possessions situated behind it upon the eastern coast of Africa, should be the watershed, or water-parting line, between the rivers Nile and Congo."

It is true that the quoted Agreement establishes the watershed between the rivers Nile and Congo as a boundary along a part of the frontier, but it is also true that in some other parts of it the same principle has not been followed. Article 1 prescribes that to the north of the German sphere in East Africa the dividing line must run along the 30th meridian east of Greenwich. Theoretically, the mathematical line agreed upon in this region may cut rivers or lakes; practically, so it happens, as any map may show. The frontier between the English colonies and the Congo Independent State crosses through Lake Albert Edward and intersects the river Semliki.

The quotation is therefore against the Chilian contention, but the attention of the Tribunal is called upon to observe the tendency which the Chilian Representative reveals in setting forward the Treaty of May 12, 1894. This Covenant determines the water-parting line in a zone where mountains do not exist. The divide between the rivers Congo and Nile is not to be found in a chain, or along an orographical feature. It is not possible, therefore, that that Treaty can be considered applicable when dealing with a boundary which must be marked out within a Cordillera, and within a Cordillera whose loftiness is so remarkable as that of the Andes.

The Cordillera de los Andes may be blotted out from the maps, as has been done in some Chilian official charts. If it should disappear, the Treaty of Brussels

* Treaty of May 5, 1859. Besides, the Treaty does not order the water-parting to be followed as an invariable rule. Its Art. 2 stipulates the cutting of the Rio Negro, near the island San José and the Maturaca Channel.

might be quoted in order to define the Argentine-Chilian boundary ; but, while that Cordillera stands along the South American Continent, and while the Agreements remain in force, any argument based upon examples from other countries in which the limit is demarcated in flat grounds or in gentle undulations, is quite inapplicable.

(e) *Case of British Columbia.*—In this colony it is said by the Chilian Representative that the water-divide of the Rocky Mountains separates it from the territory of Alberta.

The internal subdivisions within the colonies forming the Dominion have been marked out independently of precedents and traditions, and it is not, therefore, correct to put them forward as instances to be followed by countries which have been influenced in their boundary controversies by traditions and precedents. Notwithstanding, as it has been considered proper to quote those colonies, it may be said that in Canada, the intersections of rivers by the meridians and parallels adopted as confines, are so frequent that they may be taken as the general rule.

The case of British Columbia is not an exception, as could be assumed from the statement of the Chilian Representative. Its boundaries were defined by Act of July 28, 1863 (26 and 27 Vict. c. 83), and in it nothing is to be read about watersheds or continental divides. The eastern limit, on the contrary, is settled in the Rocky Mountains and the 120th meridian of west longitude. The mathematical line of the meridian intersects watercourses (the Wapiti and the Peace, for instance) in the same way that watercourses are intersected by all the boundary lines of all the subdivisions of the Dominion. The line along the Rocky Mountains is, besides, depicted in some maps cutting through a watercourse near Mount Hooker ; but if it were not so, the only conclusion to be deduced therefrom would be that rivers do not cut the Rocky Mountains in that region as they do in some others.

The Chilian Representative will not find corroboration of the impossible demonstration which he has undertaken. It is not possible to assume that a line can pass over a chain of mountains without going out of that chain, and at the same time pass over the headsprings of the rivers which, taking their rise at a distance, cut the chain in their course. The maps of British Columbia do not and cannot ever lead to such a conclusion.

(f) *Case of the United States.*—The case of the United States is even less applicable. It is only necessary to take a map of that country to obtain the

profound conviction that the boundaries of the States which constitute the nation have in no case been marked out in deference to the rules of the water-divide. All of them possess rivers which they share with their neighbours.

It is true that the Rocky Mountains stand between Idaho and Montana along a section of the frontier, and as the chain in a portion is not crossed by rivers, there are not, of course, any rivers which have been cut by the dividing mark. Therefore the divide has not been preferred to the chain, but the chain had the preference over the divide.

Besides, there are watercourses cut through by the boundary line between Idaho and Montana, as the river Kootenay, for instance.

(g) *Natal Colony*.—By examining the quotation made by the Chilian Representative regarding this case, conviction is acquired that instead of it being consistent with the theory he upholds, the consequences to be derived from it are quite opposite to his contention. He says :—

“Its western boundary was, according to a Proclamation of February 3, 1858, defined as the crest or watershed of the Drakensberg or Quahlamba range from the first affluent of the river Umzinyati to the principal western source of the river Umzimkulu.”

The continental divide is not even mentioned in this passage, and the watershed referred to is the one peculiar to the Drakensberg range. The meaning of the word watershed appears as clear as could be desired, since it is used as a synonym with the word “crest”: in the “crest or watershed” the boundary line is to be sought.

The Argentine Republic does not reject the watershed if it is located in the principal chain of the Cordillera de los Andes. The line of the Argentine Expert follows in the main range the special watershed that is produced therein, and when doing so he naturally disregards the many other watersheds to be found in lateral mountains or in plains.

The Rule prescribed by the Proclamation of 1858 relating to Natal, as quoted by the Chilian Representative, does not allow any swerving from the Drakensberg range in the tracing of the line, nor does it permit any deviation from the crest.

The quotation once more proves that when referring to mountains the watershed is only mentioned to locate in the crest, and always in the crest, the dividing line between two countries.

(h) *Case of Sierra Leone*.—The case of the Protectorate of Sierra Leone is obviously extraneous to the controversy. The question here—and this is recog-

nised by the Chilian Representative—is one of a watershed occurring in the plain. No chain of mountains is there to be found, and under those circumstances any boundary was permissible. But what connection is there between a conventional line on flat ground along the headsprings of rivers, and another line which should, in the first place, follow the trend of a Cordillera, and in the second place should follow its main chain?

It is also to be observed that the Agreement signed at Paris, January 21, 1895, between Great Britain and France, fixing the boundary between the British and French possessions to the north and east of Sierra Leone, determines a line that, as the map annexed to it shows in a positive manner, intersects the rivers Great Skarcies, Kita, Lolo, Little Skarcies, etc., so confirming the rule according to which the cutting of watercourses is considered as a matter of course.

Though the Chilian Representative cites this Treaty on behalf of his contention, it favours, as has been seen, the unquestionable rights of the Argentine Republic.

(i) *Case of Burmah and Thibet.*—The Chilian Representative has invoked the Treaty signed in Peking, according to which, he says, the frontier “was placed to a large extent on the water-parting line between the basins of the rivers Salween and Mekong.”

The Treaty referred to orders the line to be traced in some parts along the watershed, but in some others it determines the crests and ridges to be followed (Articles 1, 2 and 3). The boundary settled by it runs along ranges and plains, as the Treaty does not fix a standard rule to be observed, and it does not establish either that the whole course of rivers shall be respected, or the continental divide adopted. Far from this, the watercourses are cut through whenever it is deemed necessary, and the frontier line crosses the Taping, the Shweli, the Salween, the Nam Ting, the Namlam, etc. So it is shown in the skeleton map annexed to the Treaty.

Every case put forward by the Chilian Representative leads to the same result. None of them favour the continental divide. All of them corroborate that the cutting of rivers is always politically feasible, and that Nations in search of safe and *arcifinious* boundaries never abandon them in order to trace winding and changeable frontiers along sources.

(j) Considering it probably as the most conclusive argument, the Chilian Representative has reserved for the last paragraph the fact that the President of the Argentine Republic, General Roca, in the capacity of arbitrator, “decided

that the *divortium aquarum* of the Córdoba range should be the boundary between the Provinces of Córdoba and San Luis."

This is one of the many occasions on which the Chilian Representative falls into the same error, as the Córdoba range is not crossed by any river in the short section in which that range serves as a boundary between San Luis and Córdoba. The Argentine Republic has never denied that the watershed might serve as a boundary, when its special characteristics are taken into consideration, i.e. when that watershed occurs in the crest of the mountain. The Sierra Grande de Córdoba is very compact. The waters descend from its most elevated crests down its two slopes in opposite directions. Within that crest the boundaries have been marked out in the dividing line of the streams; but if there had been a river which, starting from flat ground or from any detached peak, should afterwards intersect the axis of the chain, that river would have been crossed in the same manner as the Rio Quinto is cut by the frontier line between San Luis and Córdoba further to the south.

All the examples quoted with such minuteness by the Chilian Representative are therefore reduced to proving:—

(1) That sometimes on flat ground, where there are no mountains, and where consequently no orographic limit has been agreed upon, the nations have had recourse to the *divortium aquarum* in the absence of some other line.

(2) That at other times, when an orographic boundary has been agreed upon, and when the chain which constitutes it is not cut by waters, those waters have not been crossed by the boundary line.

It is needless to say that neither of these two conclusions has any direct or indirect bearing on the Argentine-Chilian controversy. The boundary cannot run over plains since it has been expressly agreed that it shall run along the Cordillera de los Andes; and this Cordillera is not so compact as to prevent its being pierced by streams which take their rise in distant places.

Similar cases do not necessarily lead to similar conclusions in International Law. A convention may modify the rules to be observed; but at any rate, if for the sake of argument it should be desired to make a comparison between the course adopted in a given instance and that which must be followed in another, it is essential that the circumstances surrounding the main facts shall be identical. It is not sufficient to say that in one case, in two, or in ten, a parallel or a meridian has been adopted as a boundary line, in order to conclude that all countries should be divided by meridians and parallels, as in each case

many reasons may counsel the rejection of the mathematical lines. It is not sufficient to say that in one case, in two, or in ten, the division of the waters in the plains has been strictly adopted in order to determine that the same doctrine shall be applied to mountains. It is not sufficient to say that in one case, in two, or in ten, the chains are not crossed by rivers, and that consequently the boundary which passes over them does not divide streams, in order to conclude that there is no chain crossed by rivers whose sources are in the plains, and that consequently the boundary is to respect the whole of the watercourses.

If the Chilian Representative desired to find physical features which were to any extent comparable to the Andine Cordillera, to the south of Perihueico, he might for instance study the boundary line between Transylvania and Roumania. There he would have found orographic boundaries—the Carpathian mountains—and there he would have found a chain crossed by rivers—the Aluta and the Schyl amongst others. But there he would also have found that the mountains are not abandoned for the purpose of going down to the sources, but on the contrary, the rivers are crossed in the direction of the axis of the range.

The reference to countries in which the water-divide has been respected on plains, or in sierras not crossed by streams, would warrant the mention of those countries whose boundaries intersect rivers, no matter what the circumstances may be. The list would be interminable. In fact it is difficult to mention a continental nation throughout the whole world whose boundaries do not intersect some river or stream, and even that part of the Argentine-Chilian boundary already marked out cuts the affluents of the Rio Gallegos, and some streams in Tierra del Fuego. But this is not all. Countries divided by mountains, in defining their limits of jurisdiction, have set aside the origins of rivers.

Apart from the typical case of the Carpathian mountains, in which the Austro-Roumanian boundary intersects the rivers that cross the chain, it is known that the line of the Pyrenees leaves on French territory the sources of the Spanish river Segre, and leaves on Spanish territory the sources of the French river Garonne; that the line of the Alps between France and Italy intersects the river Roja; that the northern frontier of India cuts several tributaries of the Ganges and Indus, in spite of the Himalayas; that “the break in the continuity of the Alpine chain, marked by the deep valley through which the main branch of the Adige descends first southward and then eastward from its source to Meran and Botzen, is one of the most remarkable features in the orography of the Alps” (Ball); that the Franco-Swiss frontier intersects, in the

Jura mountains, the river Orbe ; that several instances of similar intersection are to be found in the extended mountainous frontier of the Chinese Empire, and that the lines prescribed by the Treaty of Berlin intersect numerous rivers between mountains, etc.

The Chilian Representative has been forced to own, before overwhelming evidence, that frontier lines do not always follow the continental water-parting, and that sometimes they do cut watercourses. It is true that he qualifies these facts as exceptional, but in doing so he forgets that all the frontiers of every continental country are in the same predicament. The exception, therefore, becomes a general rule.

He adds that the cutting through of rivers, when it takes place, has always been agreed to at the time of drawing up the Treaties, either by means of a general rule clearly expressed, or, as more frequently is the case, by referring nominally to the points where the boundary line deviates from the watershed ; and quotes the frontier along the Grand Balkan as an example of the first kind, and the Boundary Agreements of Burmah-Thibet, of Natal, etc., as examples of the second kind.

It is therefore clearly seen what a contradiction the Chilian Representative has incurred. He brings forward the same examples to prove sometimes that the watershed has been followed, and sometimes to prove that the watershed has been set aside in consequence of the considerations which he adduces. Obviously this argument must fall through, be it considered in one or the other sense, since they are inconsistent with each other.

Furthermore, the reasons set forth in this part of the Chilian Statement in order to explain the cutting through of rivers, are perfectly applicable to the Argentine contention.

The Treaties did not specify in detail the points and stretches through which the frontier line was to run, since at the time they were negotiated the orographic features of the Cordillera were not known in detail. The "general rule clearly expressed," to which the Chilian Representative alludes, was, however, expressly agreed upon, when in unequivocal terms it was established that the line should run along the main chain of the Andes, without in any way mentioning watercourses, and when it was specified that "parts of rivers" might belong to either country.

The rule, therefore, could not be more general, neither could it be more forcibly expressed.

6. *Maintains always in its course a more uniform average height.*—This is the last

of the advantages which the Chilian Representative attributes to the continental divide. When it coincides with the watershed of the main chain the observation is well grounded, to a certain extent, and is an argument in favour of again recommending the boundary thus marked out ; but when it does not coincide, when it is sought to carry the boundary, in the manner proposed by the Chilian Expert, to the south of Mount Perihueico, the observation leads to a contrary conclusion. "It (the continental divide) never descends," it has been said by the Chilian Representative, "to the deep valleys which the rivers have excavated in descending from the heights to find an outlet to the lower land." However, as a matter of fact, it descends from the mountains to the plain, rises from the plain to the mountain, passes, at one time over the Cordillera, at another outside it ; it continues over great elevations in some parts, in others it goes round districts stretching into the Patagonian tableland ; is elevated at one time and depressed at another. The height is never a characteristic of such a line. It depends upon the sources of the streams, and these are to be found in all sorts of features of the surface, from the snowy peaks to the deepest valleys.

The oft repeated words with which the Chilian Expert described his line when submitting it to his Government, constitute the best and most complete answer as to the general uniformity of height put forward as an advantage. He said that it is not the crest of a main chain, in the orographic sense of that phrase, but simply in the hydrological sense of presenting a succession of crests, depressions and any kind of features of the ground whose continuity consists in the fact that it is not intersected at any part by any watercourses, great or small. If, therefore, the Chilian Expert himself, the author of the project, confesses that he has followed crests, depressions and any kind of features, it is obvious that the uniformity in height has not been kept in view at all, nor can it have resulted in practice.

Again, the Chilian Representative, in another part of his Statement, furnishes elements to refute his own theories. He says :—

"According to the plan of delimitation proposed for that region by the Chilian Expert Señor Barros Arana, the frontier line starting in the neighbourhood of Mount Tronador (at a height of 3458 metres), in lat. $41^{\circ} 9'$, and following invariably the *divortium aquarum*, or water-parting line, imposed by the Treaties, would pass over crests of mountains of the following heights in metres, which have been measured and are enumerated, in the direction of north to south :—1382, 1895, 2337, 2386, 1067, 813, 2087, 1948, 2143, 1311, 1830, 800, 770, 1030, 1630, 650, 1330, 866, 2015, 1116, 1147, 1285, 1419, 869, 1095, 1170, 900, 1800, 810, 619, 1352, 1450."

A line passing over points that rise above the level of the sea in an alternative scale fluctuating between 619 metres and 3458 metres, does not suggest uniformity in height.

If the enumeration of points had been carried to a greater extent, the Chilian Representative might have added to his list the height of Mount Tres Cruces, 6780 metres, and the heights of the Plains of Diana, 40 to 80 metres, both in the continental divide. Keeping in view those points, it is impossible to contend that there exists in the line of the Chilian Expert the uniformity of average altitude which is alleged in its favour.

The two Plates annexed—representing Mount Tres Cruces (Chilian landmark No. 10, Argentine landmark No. 3) and the Plains of Diana (Chilian landmarks Nos. 346 and 347)—give a graphic idea of the inconsistency of a line, which not only is not uniform in its height but that sometimes runs along gigantic summits where the snow never melts (22,245 feet), and some others through marshes and swamps whose altitude above the level of the sea (130 to 260 feet) is inconsistent with any orographical features.

The survey of the ground on which the Argentine Republic insists, in the first place because the Agreements sanction it, and in the second place because it will reveal the geographical features as Nature presents them, will be the best proof that the line of the South American divide proposed by the Chilian Expert does not present any advantage whatever, when compared with the line of the Cordillera de los Andes in the local division of the waters belonging to the main chain, and which is the one agreed to by both countries in their solemn Covenants.

5. RULES OF INTERNATIONAL LAW.

The examination already made of the rules of International Law governing this subject has demonstrated that, according to the unanimous opinion of writers—before and after the Treaty of 1881—those countries which are separated by mountains extend their rights of property along the entire slope facing them, as far as the culminating line; that when those writers referred to the watershed, they have done so in the sense of locating, within the crest, the precise points through which the line crosses; that no one, absolutely no one, has spoken even incidentally of the continental divide; that still less have they insinuated that the orographic boundary could be transformed into a hydro-



MOUNT TRES CRUCES (6780 m.; 22,245 f.).
Argentine landmark No. 3, Chilean landmark No. 10.



PLAINS OF DIANA (40 to 80 m.; 130 to 260 f.) IN THE CONTINENTAL DIVIDE, FROM PUNTA ALTA.
Chilian landmarks Nos. 346 and 347 in "unnamed pass" and "unnamed hillock."

graphic boundary, and that it is contrary to their views and doctrines, when dealing with a chain, to abandon that chain and descend to distant plains in search of sources.

It is not necessary to revert to this point, although the Chilian Representative insists upon it. The considerations already expounded suffice to prove that theories rejected by Treaties, expressly worded to put an end to them, have no foundation in international law.

International law regards mountains as the best possible boundaries, and considers that one of their advantages is that the States who adopt them are *arcifinious*. The arcifinious boundary of a State is, as is well known, one which is suitable for national defence. A mountain would cease to comply with this condition if, whenever a river opened a breach in it, it were permissible to abandon that mountain in search of the distant source.

Writers favour orographic features as the best defensive boundaries, and consequently the watershed to which they refer is the line of the most elevated crests.

If, apart from the authors already quoted, it were necessary to mention any other, their opinions might be corroborated with the following paragraph taken from Sir Travers Twiss :—

“ A title to territory by reason of contiguity (*ratione vicinitatis*) in the case of *arcifinious* States, so called according to Varro, because their territory admits of boundaries *fit to keep the enemy out* (*fines arcendis hostibus idoneos*), in other words, of States whose territory admits of practical limits, such as rivers and mountains, is a *reciprocal title*. In such cases each State has an equality of right, so that the *watershed line or line of greatest elevation in the case of mountains*, and the *Thalweg or mid-channel*, in the case of rivers, which corresponds to a line drawn along the lowest part of the bed of the river or the line of deepest depression, forms the juridical boundary between two such States.” *

What the Argentine Republic desires, in pursuing the application of the Treaties, is to have a *reciprocal title* to the Cordillera, the two slopes of which would be incorporated to Chile if the continental *divortium fluminis*, upheld by the Chilian Expert, were taken as the standard. What the Argentine Republic upholds is that the *arcifinious* boundary should be respected, that the limit *fit to keep the enemy out* should be preserved, and that in the line of *greatest elevation* shall be sought the watershed.

* Sir Travers Twiss, *The Law of Nations considered as Independent Political Communities*, Oxford, 1884, p. 215, para. 132.

6. THE CONTINENTAL DIVORTIUM AQUARUM IS NOT STIPULATED IN THE TREATIES.

The detailed examination of the clauses which govern the Argentine-Chilian boundary leads, under the manifold aspects under which they can be studied, to utterly condemn the interoceanic divide. This examination is more than sufficient to prove that conclusion, but as the Representative of Chile has taken up some of the arguments used during the long controversy, with the idea of minimising their force, it is convenient to insist upon them once more.

The Treaties in force contain no clause whatever on which the line projected by Señor Barros Arana might be based. In order to establish the criterion to which it corresponds it would have been necessary to state it in very clear terms. It was, moreover, very easy to do so. It would have sufficed, for example, to say, that the limit would be formed by the line which separates the rivers flowing to the Atlantic on one side, and to the Pacific on the other, or, in other words, by the line of the continental divide. But nothing of this is said.

The Treaty of 1881 determines another rule. The boundary from north to south as far as lat. 52° , is the Cordillera de los Andes. There is the main principle, the fundamental basis of the demarcation.

There are several rivers that cut through that Cordillera, as has been stated even by Chilian explorers. If the limit (as it is beyond all dispute) is the Cordillera de los Andes, the continental divide theory must therefore be rejected. During the long controversies carried on by Chile and the Argentine Republic for fixing the boundaries, never once did the Government of Chile, before the fundamental Agreement of 1881, mention in any definite manner the interoceanic divide. When that Government did allude to the watershed it meant the highest crest of the Andes "and nothing else." Only once did the Minister, Señor Barros Arana, allude to the watershed, in general, without any qualification, and on that occasion the phrase was rejected, because its very vagueness might lead into grave error. In order to accept the continental divide, it would be necessary to modify the wording of the Treaty of 1881, by adding and suppressing some of the expressions used in it.

The Treaty of 1881 begins thus :—

"The boundary between the Argentine Republic and Chile from north to south as far as the parallel of lat. 52° S. is the Cordillera de los Andes."

This stipulation could not be clearer or more imperative ; but in order to maintain the interoceanic divide, the Representative of Chile tries to set aside the clause by saying :—

“Rather than an absolute prescription, it is the indication of a *wish*, the realisation of which is desired by the Parties, provided it be compatible with the demarcation on one simple natural principle.”

In other words, although the Governments have agreed that the boundary shall be the Cordillera de los Andes, the phrase, according to the Chilian Representative, must be understood in the sense that this Cordillera might be, or might not be the boundary—it is a simple manifestation of a desire of more or less importance.

The Treaty of 1881 continues thus :—

“*The frontier line shall run in that extent along the most elevated crests of said Cordilleras that may divide the waters, and shall pass between the slopes which descend one side and the other.*”

No one will see in this passage that the line of separation of hydrographical basins is meant to be the boundary line. It is clearly prescribed, on the contrary, that the boundary must be sought in the most elevated crests of the Cordillera de los Andes that may divide the waters, and that the line should be marked out in the intersection of the slopes. To make this passage agree with the continental divide, it would be necessary :—

1. To omit the words “*of said Cordilleras.*” With regard to the first paragraph, the Chilian Representative has said that the words “the boundary is the Cordillera de los Andes” are the indication of a *wish*, and for this reason he discards the Cordillera altogether. When dealing with the second paragraph, he follows the same plan, even though it is therein expressly said that the frontier line “*shall run along*” that Cordillera, terms which certainly mean more than a mere “*wish.*”

2. It would be necessary to omit the words, “*the most elevated crests.*” In order to do so, the Chilian Expert has considered that it sufficed to say in his Note of January 18, 1892 :—

“The truth is, Sir, that the expressions ‘Cordillera crests,’ ‘culminating points,’ ‘highest summits,’ etc., answer the general idea that there exists a line of heights that coincides with the division of the waters, as they are so depicted in maps and plans in common use ; but a survey in detail of the mountains and especially of the Andes, proves

that there exists neither such a line of high crests, nor are all these crests, or even the greater part, located in the 'Cordon' dividing the waters."

That is to say: just as the mentioning of the Cordillera is reputed to be "the indication of a wish," so the mention of "its most elevated crests" is reputed to be the consequence of an error.

3. It would be necessary to add the adjective "*continental*" to the noun "*waters*." With this object in view, the Representative of Chile declares:—

"If it were claimed that this phrase means only the summits dividing a certain part of the waters, it would be useless, as it would leave the problem of delimitation as vague as before; for, although there is only one general water-divide not crossed by any water-course, there are an indefinite number of secondary divides, amongst which the selection would have to be made, if such an interpretation were accepted."

In the Treaty itself the difficulty does not exist, since it ordains that among the "divides," that of "the most elevated crests" must be chosen. But as the Representative of Chile omits the words "most elevated crests," he, disregarding the Treaty, and forgetting altogether the Cordillera de los Andes, follows his own ideas in the matter, and chooses the continental divide as he might have chosen any other.

4. Finally, it would also be necessary to change the phrase "shall pass between the slopes which descend one side and the other," replacing it with this: "shall pass between the sources flowing down to either side."

Furthermore, in order to support the Chilean contention, it would still be necessary to maintain that the phrase "divortium aquarum of the Andes" is equivalent to "divortium aquarum of the continent." Accordingly, and notwithstanding that the Romans had not a clear idea of the hydrographic system of continents, the use of the Latin formula is urged as an argument. Thus the Representative of Chile says: "Even more convincing if possible is the fact that the negotiators have entered in Article 2 of the Treaty the Latin expression "divortia aquarum," which embodies the idea of the division of the waters of the continent, thus reproducing the same idea expressed in Spanish in Article 1."

When affirming that the continental divide is totally extraneous to the Treaty, the Argentine Republic not only refers to the antecedents of the Treaty and to its spirit, but stands by its very letter, without assuming that one of its stipulations is a mere *wish*, and another the consequence of an error, and without changing its words or their meaning. She applies the Convention in its entirety, in the form in which it has been agreed upon, and proceeding thus, she does not

find in it any mention whatever of an interoceanic divide, as none was found by the Chilian Government, when in their laws and decrees until 1888 they adhered to the orographic views embodied in the Covenant on defining the jurisdictional limits of internal political subdivisions, and later on when claiming lands situated to the east of that continental divide.

The doctrine of the separation of hydrographical basins is opposed to the Treaty of 1881, and even more to the Protocol of 1893 which was negotiated with the primordial aim of putting an end to this very erroneous doctrine. *Before* the Protocol of 1893, it could only be said that the Treaty did not harmonize with that theory ; *after* the Protocol of 1893, it must be affirmed that it was explicitly rejected.

The detailed study already made of the Protocol is a clear proof of this truth ; nevertheless it is persistently stated by the Chilian Representative that the boundary is the interoceanic divide. To arrive at such a conclusion, it would be necessary :—

1. To set aside not only the antecedents which gave rise to the Protocol, but also the negotiations between the Governments. In fact, the Chilian Representative makes no allusion to them.

2. It would be necessary to persist in disregarding the Treaty of 1881, notwithstanding that its stipulations are maintained in Article 1 of the Protocol when ordaining that the Experts and the Sub-Commissions shall observe the principle according to which the Cordillera de los Andes is the limit, as an invariable rule of their proceedings.

3. It would be necessary to declare that the clause according to which “parts of rivers” may belong to both countries, does not mean that “parts of rivers” may belong to Chile and other parts to the Argentine Republic.

4. It would be necessary to interpret in a hydrological sense the words “principal chain.” Both Governments, with the aim of doing away with “hydrographical basins,” declared that in their opinion, “and according to the spirit of the Boundary Treaty, the Argentine Republic retains her dominion and sovereignty over all the territory that extends from the east of the *principal chain* of the Andes to the coast of the Atlantic.” The Chilian Expert considers that there are two kinds of “principal chains,” those which are so from an orographic point of view, and those which are so in a hydrographic sense ; and after drawing this distinction, he says, that the principal chain which he has followed is the hydrographical one, although, as has already been said, such a

chain is not to be found in Patagonia, since it is obvious that a chain cannot be formed by "crests, depressions and any kind of features of the ground."

5. It would be necessary to put aside the hypothesis in the Protocol, according to which the limit agreed upon, viz. the Cordillera de los Andes, might penetrate into the channels of one of the two oceans. This single clause would in itself suffice to prove that there has never been any intention of taking into account the separation of waters between the two oceans. The Chilian Representative does not comment upon this clause.

6. It would be necessary to omit the Article which provides that the landmarks should be placed in the passes and accessible points of the mountain.

7. It would be necessary to omit the clause which declares that the course of the rivers, on descending to the valleys, is not indispensable for the demarcation.

As even with all these alterations the Protocol of 1893 would not justify the theory of the continental divide, the Chilian Representative, as a last resource, tries to convert into a general rule, a clause which only refers to a special case. Though the groundlessness of this argument has been clearly proved, he constantly repeats that the water-divide is "the geographical condition of the demarcation," thus transforming into a *sole* condition, one of the many that the Treaties specify, and adding for this purpose phrases that do not appear in the text.

When affirming that the Protocol of 1893 rejects the theory of the Expert Señor Barros Arana, the Argentine Republic cites, to uphold her assertion, the negotiations which had preceded the framing of it, the spirit in which it was drawn up, and the text of its clauses, both in its entirety and in detail, without omitting a single phrase, or putting aside a single idea.

The Agreement of 1896, the Record of May 1, 1897, the Record of September 22, 1898, documents which have been laid before the Tribunal, accentuate the orographic character of the frontier, and in none of these documents is any mention made of the interoceanic divide, either as a stipulation, as an indication, or as a reference of any kind.

There is, therefore, quite sufficient reason for affirming that the interoceanic divide has never been agreed upon, and that the mere inferences by means of which the Chilian Representative tries to uphold his theories, are openly opposed to the International Conventions.

It is not by quoting private opinions (though they may form auxiliary elements) that the true construction of a Treaty may be arrived at; it is the letter, the manner in which its dispositions appear to be drawn up, that should be examined. The spirit which has actuated the negotiators, helps to

lighten doubtful points, and ought always to be consulted. In the Argentine-Chilian controversy, no negotiator, when framing the Agreement, has ever said that they sanction the principle according to which the rivers are, from their very sources, the property of one or other nation. The Agreements themselves are either silent on the fact, or they contain articles which contradict such a principle. What is, therefore, the value of opinions of private persons who have based them on anything but the actual Treaties?

These remarks easily come to the mind when it is seen that the Chilian Representative trying to contradict the Argentine contention according to which the *divortium aquarum* is a doctrine extraneous to the Treaties, asserts that Señores Yrigoyen, Zeballos, Leguizamon, Brackebush and Latzina consider, or have considered, that the interoceanic divide is the Argentine-Chilian boundary. Instead of their opinions, he should have cited the concrete clause of the Agreement in which such doctrine appears, the clause in which, without suppressing some words or altering their meaning, the whole thought is prominently brought out.

Those opinions, moreover, do not agree with the contention of the Chilian Representative, as it has already been seen. Far from this, they lead to the opposite result. Those writers have expressed views antagonistic to any project which might conduce to taking away the frontier from the Cordillera de los Andes. There would be no object in repeating the considerations already made on this matter. It is enough to recall them, in order to affirm that none of those writers coincide in their views with the theory of the continental divide. When they have spoken of waters, they have referred to those which separate in the higher crest of the Cordillera de los Andes, and they have done so with the purpose of localising the line in the principal chain of the Andes and in the line of intersection of its two slopes.

When the Chilian Representative puts forth some passages from those writers, as being in accord with the doctrine of the continental divide, he applies to them, perhaps, the same way of reasoning used when dealing with the Treaties, that is to say: to discard the Cordillera de los Andes as a "mere indication of a wish," and the "most elevated crests" as the result of an error; to affirm that when "waters" are spoken of, they must be the continental ones; and to put aside altogether everything that in the paragraphs quoted, or in others those authors may have written against the same doctrine.

The only *divortium aquarum* mentioned in the Treaty of 1881 is the *divortium aquarum* of the Andes, which is, according to the Protocol of 1893, the watershed of the principal chain of the Andes.

The Chilean Representative shows an earnest desire of finding the theory of the continental divide in harmony with the Covenants, but in pursuance of that aspiration he sets aside once more the letter of the same Covenants, and recalls the articles published by Señores Godoy and de la Serna. These gentlemen, indeed, erroneously believing that the continental divide is always to be found within the Cordillera de los Andes and on its principal chain, as it happens opposite Mendoza and San Juan, took it for granted and beyond dispute that it so occurs along the whole frontier. They never said that the principal chain of the Andes could be abandoned under any pretext whatever; but they committed a geographical error, owing to the insufficient personal knowledge they had regarding the zones in dispute. Neither of them has visited the ground in the southern regions where the rivers cut through the range. Against their opinions may be opposed the data collected on the very spot, which utterly destroy the basis of their reasoning, and, therefore, all conclusions drawn from it. Their deductions are so erroneous, that in a sentence which has been cited, one of them calls hybrid the existence of rivers which belong in their course to two nations, when the truth is, that almost all the great rivers in the world would have to be called also *hybrid* since they flow through and cross territories which are politically diverse.

If the works of authors who have committed obvious mistakes owing to the lack of personal surveys were to be considered as reliable, the Argentine Republic could avail herself in the present controversy of several Chilean maps which partly, at least, favour her unquestionable rights. As typical examples the following may be quoted:—

1. Atlas de Chile by Juan Türke, Santiago, 1895. Señor Türke, Professor in a Santiago college, states in his Atlas that it has been corrected in accordance with the latest data, and if the maps are carefully studied, it is found that should the boundary line be marked out as it is drawn on sheet 6, it would cut through several rivers. Señor Türke depicts the boundary passing over the peaks Mercedario and Juncal, which, as it is known, are situated outside the watershed, the former eastwards and the latter westwards of it. But, notwithstanding that the maps are used for public teaching in Santiago, they are not reliable enough to be depended upon. In sheet 3, for instance, Mounts Sapalegui, Llullaillaco and Cachi are depicted as belonging to the same chain, and the Chilean geographers Bertrand, San Roman, Muñoz, etc., have had an opportunity to acquire the certainty that the Cachi is located in one chain—the Cordillera Real de Bolivia—that the Sapalegui is near an intermediate chain, that the

Llullaillaco is in the Cordillera de los Andes, and that these chains are very distant from each other, so much so that any confusion between them is impossible.

2. New map of Chile corrected and enlarged in view of the large topographical charts of the provinces, drawn by order of the Government; with fresh information relating to railways, steamship lines, etc., published by Recaredo S. Tornero, Santiago, 1893. This map shows several rivers cut through by the boundary line, but at the same time depicts an interoceanic waterway through the river Rabudos, which geography does not confirm. Moreover, notwithstanding its alleged accuracy, it states in large type that Patagonia is inhabited by Puelches and Huhiliches Indians, in the regions where, prior to 1881, Argentine settlements existed.

3. Map of Chile, published by the Librería del Mercurio de C. Tornero y Cia., Santiago, 1898. On this map also some rivers appear crossed by the boundary line; but in it too the interoceanic waterway through the river Rabudos is depicted as well as the existence of Pehuenche Indians in the Argentine territory of Neuquen is mentioned.

4. *Map of Chile, drawn for the use of Public Schools, after the latest data—General Department of Public Works—Fourth Section, Mines, Geography and Geodesy. Washington Lastarria, Chief Engineer; Ricardo Martinez V., First Engineer.* This map, issued by an official Chilean Department, places Lake Buenos Aires in Argentine territory, which lake the Chilean Expert, Señor Barros Arana, pretends belongs to his country. As a compensation, it is to be presumed, it places in Chile, Lakes La Plata and Fontana, the outlet of which to the Atlantic through the river Senguerr appears suppressed. The ownership of these two lakes, acknowledged as Argentine, has never been disputed since the Treaty of 1881.

Were it correct to invoke these maps,—some official, others of a private character, but all of Chilean origin,—notwithstanding that they convert into one several mountain chains, or depict interoceanic waterways, or reproduce obsolete stories of Indian settlements, or suppress well-known outlets, the conclusion would be arrived at that the Chilean maps acknowledge the fact that rivers may be cut through and that Lake Buenos Aires is Argentine, unassailable facts albeit the numerous inaccuracies which pervade the quoted charts.

7. THE BOUNDARY MUST BE OROGRAPHICAL AND NOT HYDROGRAPHICAL.

One of the many difficulties that the line of separation between the tributaries of the Pacific and the Atlantic Ocean offers as a boundary, is that it changes the primordial base of the Boundary Agreements, transforming the orographic frontier which they sanction into a hydrographic frontier which they do not mention. In order to avoid this difficulty, it is argued :—

“The frontier line between Chile and the Argentine Republic, stipulated in the Treaty of 1881 and in the Protocol of 1893, must be orographical, since it has to run over the highest summits which divide the waters; and must be hydrographical, since it must pass between the streams and springs which flow down one side and the other, thus dividing the basins or regions tributaries of the Atlantic on the east, from those of the Pacific on the west.”

If this sentence be examined, it will be seen that the frontier has an orographic character, for, “it has to run over the highest summits which divide the waters,” a clause which the Treaties establish. It is contended that the frontier has a hydrographic character, for, “it must pass between the streams and springs which flow down one side and the other, thus dividing the basins or regions, tributaries of the Atlantic on the east, from those of the Pacific on the west,” a clause which is not contained in the Treaties.

The orographical frontier is expressed in the Agreements, the hydrographical one can only exist by adding or omitting some words in them.

It must be noted that though the dual character is thus established, the Chilean Representative gives the preference to hydrography in all cases in which it is at variance with orography. In other words, the dual hypothesis oro-hydrographical is only maintained by the Chilean Representative, so long as both elements coincide on the ground, but, in the event of not being so, he discards orography to deal only with hydrography. The line proposed by the Expert Señor Barros Arana—he has said it himself—“is no other than the natural and effective dividing line of the waters of the South American continent.” Furthermore, in cases where the conflict is impossible, for want of rivers, and notwithstanding that orography ought to be taken into account, since it is recognised as one of the conditions to be respected, mountains are again set aside, and “the line shows itself,” adds the Chilean Expert, “without effecting more topographical operations than are necessary for determining which would

be the course of the waters where they do not actually flow." That is to say, when defending the line before the Tribunal it is contended that the boundary must be hydrographical and orographical, but when tracing the same line it has been maintained that the only standard are the sources of rivers, when they exist, and that, when they do not exist, the deficiency of Nature must be supplied by locating imaginary sources. In theory, orography and hydrography; in facts, only hydrography: this is the characteristic of the Chilian contention on this point.

Meanwhile, the orographical character of the line clearly appears from the following considerations :—

1. All documents of various historic epochs, ancient and modern, public and private, uniformly, without any discrepancy, point to the Cordillera de los Andes—which is not water—as the eastern boundary of Chile.

2. The Treaty of 1881 refers to orography in the clauses in which it is prescribed :—

(a) That the boundary is the Cordillera de los Andes.

(b) That the line runs along the most elevated crests that may divide the waters.

(c) That it passes between the slopes that descend one side and the other.

(d) That such limit will remain at all events "immovable" between the two Republics.

3. The Protocol of 1893 refers also to orography in the clauses which ordain :—

(a) That the Treaty of 1881 shall be respected.

(b) That the Argentine Republic retains her dominion and sovereignty over all the territory that extends from the east of the principal chain of the Andes to the coast of the Atlantic.

(c) That certain rules shall be followed, if in the peninsular part of the south, on nearing parallel 52° S., the Cordillera should be found penetrating into the channels of the Pacific there existing.

(d) That the work of demarcation on the ground shall be undertaken next spring simultaneously in the Cordillera de los Andes and in Tierra del Fuego.

(e) That the landmarks shall be planted in each pass or accessible point of the mountain.

(f) That the assistant demarcators shall indicate the changes of altitude and azimuth which the boundary line may suffer in its course.

4. The Instructions of January 1, 1894, refer to orography in so far that they prescribe that the Sub-Commissions shall investigate the situation in said Cordillera of the main chain of the Andes, in order to seek, in same, the most elevated crests that may divide the waters, and shall mark the frontier line on their accessible parts, making it pass between the slopes which descend one side and the other.

5. The Agreement of 1896 is exclusively based upon orographical rules in the clauses in which it declares :—

(a) That the operations of the demarcation of the boundary between the Argentine Republic and the Republic of Chile, which are being carried out conformably with the Treaty of 1881 and Protocol of 1893, shall extend in the Cordillera de los Andes as far as parallel 23° S.

(b) That should differences arise between the Experts when fixing in the Cordillera de los Andes the boundary marks south of parallel 26° 52' 45" S., and in case they could not be amicably settled by joint accord of both Governments, they shall be submitted to the decision of the Government of Her Britannic Majesty.

6. The Record of the Experts, May 1, 1897, is based upon orography, since it prescribes that the Sub-Commissions shall work in the Cordillera de los Andes.

7. The declaration of the Chilian Minister for Foreign Affairs, which made feasible the Arbitration, is based on orography, since it was therein said that the line drawn by the Expert of that country is "situated in the *Cordillera de los Andes*, as ordered by the Treaties, and in the form which they establish."

In view of these stipulations, it is clearly proved that the frontier line shall have an orographical character and not a hydrographical one. If, however, they were not enough, the following might be added :—

1. During the whole course of the negotiations which preceded the Treaty of 1881, the advisability of a hydrographic limit was never mentioned. This idea was so foreign to and so far from the mind of the negotiators, that it may be noted as a fact the eloquence of which renders unnecessary all commentary. The long negotiations continued from 1843 until 1881, terminated by adopting as frontier up to 52° a natural frontier, namely, the Cordillera de los Andes. In Tierra del Fuego, which belongs to the two nations, there was no sufficient information to affirm with entire knowledge, whether that Cordillera extended thereto. Some geographers expressed one opinion, others the very opposite.

The orographical limit, therefore, was not agreed upon, but neither was the hydrographical one resorted to. A mathematical line was agreed upon that cut through various rivers and streams on its way.

When the Treaty of 1881 has respected the line which Nature has drawn on the snowy crests of the principal chain of the Andes, it is contended that it is not possible to cut rivers, but in cases in which a conventional limit has been fixed, rivers can be cut without difficulty. Hydrography is only put forward in order to set aside mountains, but no mention of it is made, when imaginary lines have been agreed upon. In both cases, the Treaty of 1881 orders the fixed lines to be observed, without mentioning the rivers. This Treaty neither forbids their being cut, nor does it order that they should be kept in their entirety. Why then is any difference made? The only one that really exists, is that the principal rivers which the line of Tierra del Fuego crosses, empty themselves into the Atlantic through Argentine territory, whilst the rivers which the Cordillera de los Andes cuts in Patagonia, empty into the Pacific through Chilian territory.

2. Whenever the Treaties speak of waters, they do so, without a single exception, to define a detail of the demarcation, but always subordinate to the orographic principle. The waters of which they deal are those which separate themselves in the highest crests; the *divortium aquarum* which is at times indicated is the *divortium aquarum* of the Andes.

3. It is a condemnation of the hydrographic limit, the categorical stipulation, according to which all waters, whatever they may be, whatever be their course, their direction and the spot where they disembogue, whether they be lakes, lagoons, rivers, *parts of rivers* and streams, shall be Argentine or Chilian, if they lie to the east or west of a line which, according to the same Agreement in which the clause is to be found, must necessarily run along the principal chain of the Andes, to respect the sovereignty and the dominion of each country.

4. The hydrographic principle is utterly condemned by the clear expression in the Protocol of 1893, in which it is shown that the visible course of rivers when descending into the neighbouring valleys is not actually necessary in the demarcation of the boundary.

The Chilian line, therefore, in the drawing of which the Cordillera is of no importance, whilst the visible course of rivers is paramount, cannot be maintained, while the Treaties, to the strict observance of which the Experts should have to subject their operations, be in force.

8. THE WATER-PARTING LINE DIVERGES FROM THE MAIN CHAIN OF THE CORDILLERA, AND IN SOME POINTS IS OUT OF IT.

The Chilian Representative begins the paragraph in which he examines this point, thus :—

“Third Objection.—The water-parting line diverges from the main chain of the Cordillera, and in some points is out of it. These implied facts are alleged as arguments for not accepting the water-divide as a natural boundary. As we have already seen, *even admitting these as proved facts*, there cannot be any doubt about the only strict meaning of the first clause of the Treaty of 1881 ; they could only be considered so far as the expediency of negotiating another Treaty—that is, a new line of boundary—could be admitted.”

In other words, for the Chilian Representative it is of no consequence, whether the line proposed by the Expert of his country runs or not along the Cordillera de los Andes, or whether it runs or not along the principal chain. According to his views, in order to maintain that the Cordillera de los Andes is the limit, and that this must be sought in its principal chain, it would be necessary to frame a new Treaty.

The Argentine Republic cannot accept any discussion in these terms, as they would signify, among many other considerations, a complete disregard of the solemn agreements, by which Her Britannic Majesty's Government have been designated as Arbitrator.

All the Treaties and Agreements ordain that the frontier shall be the Cordillera de los Andes. In every one of them, respect to this formidable barrier is prescribed and repeated ; all generations, sanctioning the laws of Nature, have recognised it to be the dividing line of the political jurisdictions. A Chilian Plenipotentiary has eloquently said, in the name of his Government, “that they do not discuss what admits of no discussion, that is, that the eastern frontier of Chile has been, and will always be, the highest crests of the Cordillera de los Andes.” And in order to say this, is any new Treaty required ? Have those which already exist been perchance annulled ? Their categorical clauses, from the first lines of the first Article in the first Agreement and in each of the subsequent ones, do they represent nothing ? Do they signify nothing ? Would any new Agreement give them more force ? If the phrase, “The boundary between the Argentine Republic and Chile from north to south as far as the

parallel of lat. 52° S. is the Cordillera de los Andes," be interpreted by saying that in order to confine the boundary within that Cordillera, a new Treaty would be required, then human language would be powerless to express ideas, and consequently new Treaties would be as ineffective as all preceding ones.

The Plenipotentiaries of the two countries have affirmed that in the opinion of their respective Governments, and according to the spirit of the Boundary Treaty, the Argentine Republic retains her dominion and sovereignty over all the territory that extends from the east of the principal chain of the Andes to the coast of the Atlantic, just as the Republic of Chile does over the western territory to the coasts of the Pacific. Is it possible to say, bearing in mind such a statement, that the line may swerve from the principal chain of the Andes? Is it possible to contend that in order to take into account that principal chain a new Agreement would be required? But, in what other form, in what phrases, with what words clearer than those employed in the Treaties, could be expressed that the Argentine Republic retains her dominion and sovereignty over all the territory that extends from the east of the principal chain of the Andes to the coast of the Atlantic?

If the line drawn by the Chilian Expert abandons the principal chain, and even the Cordillera de los Andes, it not only violates the Treaties, not only encroaches over territories which international Conventions, sanctioned by both Parliaments, have declared to be part of the Argentine dominion, and subject to Argentine sovereignty, but even Her Britannic Majesty's Government as Arbitrator can on no account take it into consideration.

Neither Governments nor people ever imagined that the differences between the Experts would refer to districts extraneous to the Cordillera de los Andes. International agreements have explicitly determined the boundary line in its crest. To solve this point, no judges are required. But experts could diverge on the features that characterise that Cordillera, its highest crests, its principal chain. To solve this always possible conflict of opinions, the Government of Her Britannic Majesty was designated Arbitrator, and on that being done, it was prescribed that their jurisdiction should start from a single hypothesis, viz. : "Should differences arise between the Experts when fixing *in the Cordillera de los Andes* the boundary south of parallel 26° 52' 45" S., and in case they could not be amicably settled by joint accord of both Governments." (Agreement 1896, Article 2.) The Argentine Republic, trusting the word of her Expert, considered that some points and stretches of the Chilian line were outside the principal chain of the Andes, and that others were beyond the Cordillera itself. In the Record of

September 22, 1898, in which it was decided to refer the points of divergence to the Arbitrator, but before taking this step, the Argentine Minister in Santiago observed that circumstance and invited the Government of Chile to reconsider the line after a new study. The Minister for Foreign Affairs of Chile replied, that the Chilian Expert had communicated to his Government that the points and stretches just mentioned by the Argentine Minister *are situated in the Cordillera de los Andes, as ordered by the Treaties, and in the form which they established.*

It was after this explicit declaration that Arbitration was resorted to, as stated in the Record. Consequently the Argentine Republic appeals to Her Britannic Majesty's Government, confident that the manifestations of the public authorities of Chile are the outcome of sincere though mistaken conviction, confident that they conscientiously, though erroneously, assert, that the line which has been proposed is within the Treaties, since the Treaties establish that it must be traced within the Cordillera de los Andes. The Argentine Republic cannot accept that after such concrete assertions were made in the said Record, any doubt could be entertained as to whether the boundary is to be fixed within the Cordillera de los Andes. The Argentine Republic cannot accept either, that after the Chilian Government having unmistakably proclaimed that Cordillera to be the boundary ordered by the Treaties, it may be said, in their name, before the Tribunal, that the contention of the Chilian line not being in the Cordillera de los Andes "could only be considered so far as the expediency of negotiating another Treaty."

From information derived from Chilian and Argentine surveys, it is proved that the line of the continental divide is situated in a vast extent not only outside the principal chain of the Andes, but also of the Cordillera itself.

The Chilian Representative enters into a series of considerations in order to invalidate this assertion, but as he could not succeed in that, he has introduced a new formula into the controversy, a formula which no Agreement contains or suggests, and, therefore, for that very reason is utterly extraneous to the debate.

He tries to demonstrate that the sources of all the rivers that disembogue in the Pacific are situated in the "*Andine system*." Supposing that he had succeeded in this demonstration it would have no weight in the controversy, since the Treaties do not speak of the "*Andine system*" but only of "*the Cordillera de los Andes*." It is not a question of verifying whether the line traced by the Chilian Expert is or is not outside the "*Andine system*." It is a question of knowing whether it is in the "*Cordillera de los Andes*" or not, and in the event of it not being within

it, the line cannot even be taken into consideration for practical purposes in the present dispute.

It is to be noticed that the Chilian Representative, in a paragraph of his Statement, makes a distinction between "Andine system" and "Cordillera de los Andes," by saying :—

"Geographers and geologists ask themselves where does a chain of mountains start, and where does it end, and acknowledge that this is a question easier to be proposed than to be solved. They classify as portions of the 'Andine system' as well the ranges and mountains which rise to the east at a distance of almost one hundred leagues *from what is ordinarily called 'the Cordillera'* as those spreading to the west nearly to the shores of the sea."

If the line drawn by the Chilian Expert runs along these mountains which rise to the east at a distance of almost one hundred leagues form what is ordinarily called "the Cordillera," that simple fact would suffice to make obvious its inconsistency before the clauses of the Agreements.

And that this is so, appears from the only concrete quotation with which the Chilian Representative tries to support his arguments. It is necessary to deal with it, being preceded in his Statement by the following paragraph intended to eulogise the merits of its author :—

"A distinguished explorer of these territories, who is well qualified for works of this kind, by his great activity as well as by his vast and solid knowledge, and who is, besides, known to be one who does not make statements that cannot be verified as accurate, has *incidentally* touched this point."

It is well to state that this explorer is no other than Dr. Hans Steffen, who has long been in the Chilian service, being now employed in the Boundary Commission. The Government of Chile, through the Minister for Foreign Affairs, made public their acknowledgment on June 1, 1898, of the valuable co-operation which Dr. Steffen had proffered to them during many years, and it is not to be wondered at, therefore, that such laudations of the explorer made by the Chilian Government should have been repeated by their Representative before the Tribunal. But in the boundary controversy, the opinions of Dr. Steffen are not in fact anything else than those of one of the parties; and it is opportune to bear this in mind when considering them. Dr. Steffen's quoted paragraph begins thus :—

"We found ourselves surrounded in all directions of the horizon by ranges of

mountains, which, although they may not have the absolute height, nor the rugged and capricious configuration of *the ranges and masses of the Cordillera in the neighbourhood of the Pacific*, do not for that reason cease to form a part of the 'Andine system,' within which, consequently, is to be found the division of the continental waters in all the stretch explored by this expedition."

Dr. Steffen found himself in the interoceanic *divortium aquarum*, and affirms that the "Andine system" reaches thereto, and that its chains have not the absolute height nor the rugged and capricious configuration of the "*masses of the Cordillera in the neighbourhood of the Pacific*." This phrase approaches to a confession according to which the continental divide does not occur in the Cordillera de los Andes, although it may be produced in the "Andine system."

Dr. Steffen adds :—

"It is true that the line of the *divortium aquarum* in this part does not run over *consistent chains of hills covered with snow*, or with dense forests as those which obstruct the passage from the coast to the Pacific; and it is equally true that this line lies very much to the east of the *snowy peaks* amongst which the series of the highest summits should be looked for; but on the other hand, there is no reason to allege that the sources of the great rivers of Western Patagonia which are formed in these regions, such as rivers Cisnes, Pico and Palena, are at a distance of no less than fifty kilometres to the east of the last buttresses of *the Cordillera*."

It is not difficult to determine, from the description given by Dr. Steffen, which is the principal chain: whether it is the "line that does not run over *consistent chains of hills, covered with snow*, or with dense forests, and that lies very much to the *east of the snowy peaks* amongst which the series of the highest summits should be looked for"; or whether it is that other line, "which obstructs the passage from the coast to the Pacific," and which contains "*the snowy peaks, amongst which the series of the highest summits should be looked for*."

Dr. Steffen goes on to say :—

"Those who hold this opinion ought to be able to prove, with orographical and geological reasons, that the ranges of Payahuehuen, the ranges which enclose the upper valleys of Apulen and Shamon, those which run along Chergue rivulet, the gap of Putrachoique, and the valley of river Teca, should be considered as forming no part of the 'Andine system.'"

In truth, there is no object in proving that such chains do not form part of the "Andine system" in order to apply Boundary Treaties which do not speak

of the "Andine system," of a system that, according to the Chilian Representative, extends to one hundred leagues, i.e. nearly as far as Falkland Island, which might be then considered as pertaining to it. But it is evident that these chains, if they are so, are not the principal chain, neither are they the Cordillera de los Andes, as Dr. Steffen takes upon himself to prove in the last paragraph of those mentioned by the Chilian Representative, viz. :—

"The zone of the high undulating plateau and the hillocks covered with glacial material, which contains the *divortium aquarum* from parallels 45° to 43° , form a wide and continuous backbone inside the '*Andine system*' where, on account of the dryness of the atmosphere, dry and easily accessible lands are found, differing widely from the western region of the *Patagonian Cordillera*, over the high crests of which is poured all the abundant quantity of rain brought by the winds and storms of the Pacific Ocean."

The proof derived from this very Chilian statement should more than suffice ; all the more so, that dealing with the matter as a fact, the Commission to be appointed by Her Britannic Majesty's Government to survey the ground, will be able to see whether the line drawn by the Chilian Expert, to the south of Mount Perihueico, is or is not in accordance with the Agreements in their substantial prescriptions, in so far as they order it to be marked out in the Cordillera de los Andes and in its principal chain.

The contention of the Chilian Expert, according to which the line of the continental water-parting is to be found within the Cordillera de los Andes, is the consequence of a geographical theory that modern science only considers as one of the many errors of bygone days.

When the boundary is a Cordillera there cannot be established as a rule of demarcation a doctrine like that of the hydrographical basins, which doctrine might lead to the supposition that the Cordillera was in the channel of a river, since in the channel of the river its waters sometimes separate in opposite directions.

Rivers may, and often do, rise in the flat lands ; the division line of the currents which follow opposite directions is often found in zones where the undulations of the ground can only be observed by means of surveying instruments. Is it not probable that the same phenomenon may occur in Patagonia ? Is it not perchance possible that the origins of some of its rivers may be found in the Pampas ? Nothing is opposed to this conclusion. The Cordillera de los Andes is not a barrier impervious to the work of the waters in the course of time.

The small streams that rise in the plains, swollen on their course by the

tributaries they receive, acquire such volume, and their work is so persistent, that it is by no means rare to observe them open a way through the mountains. The chains and Cordilleras are frequently pierced right through by rivers of distant origin.

The Representative of Chile, with another purpose in view, makes three quotations, the reproduction of which will show, better than anything, the possibility of the fact. They are :—

1. "Wonderful as this assertion may seem," says Elisée Reclus, "before it is made clear to the geologist by the study of the ground, it is certain that many rivers are older than *the mountain ranges which are crossed by their courses*. In every part of the earth where several parallel ranges of mountains belong to different formations, as in the Andes and the Himalayas, the rivers that flowed down over the mountain slope previous to the upheaving of the new ranges, go on flowing through the barrier arising across their course. As the layers of the ground are rising, the waters make efforts to maintain their even flow; to the work of upheaval coming through the rocks, there is a corresponding work of constant erosion, and so, in the course of centuries, the corroding waters *go on sawing down through entire mountain ranges*, without altering their former level."*

2. "The principal agency in shaping topographical form is aqueous erosion," says Mr. Henry Garnett, Chief Topographer of the United States Geological Survey, and further on he adds, "While under certain circumstances the courses of streams are unstable, under other conditions streams maintain their course with great pertinacity; of this, water-gaps, and canyons across mountain ranges are striking results. Where such a canyon is found, the river flowed before the range or ridge existed. The range must have risen across its course, in which case the river, like a circular saw, maintained its course by corrosion, cutting the canyon as the mountain rose."†

3. "The illustrious Darwin extends even to the tides the action of maintaining the gaps or valleys across mountain ranges slowly arising. 'I will make,' he says, speaking of the Andes, 'only one other geological remark; although the Portillo chain is higher than the Piuquenes,‡ the waters draining the intermediate valleys have burst through it. The same fact, on a grander scale, has been remarked in the eastern and loftiest line of the Bolivian Cordillera, through which the rivers pass; analogous facts have also been observed in other quarters of the world. On the supposition of the subsequent and gradual elevation of the Portillo line, this can be understood; for a chain of islets would at first appear, and, as these were lifted up, the tides would be always wearing deeper and broader channels between them. At the present day, even in the most retired sounds on the coast of Tierra del Fuego, the currents in the transverse breaks which connect the longitudinal channels are very strong, so that in one transverse channel even a small vessel under sail was whirled round and round.'"§

* E. Reclus, *La Terre*, 1883, p. 158.

† H. Garnett, *Manual of Topographic Methods*, 1893, p. 116.

‡ El Portillo is a lateral chain.

§ Darwin, *Voyage of a Naturalist*, p. 308.

“Analogous facts have also been observed in other quarters of the world,” as Darwin said, although the process of formation may differ according to the special circumstances of each case. The chain of the Carpathians, whose summits divide the waters of streams, tributaries of the Danube, is traversed in several parts by currents which, like the Aluta, proceed from a distant source. Any map of North America shows the Cordillera of the Cascade extending from north to south in a similar trend to that of the Andes. The Cordillera of the Cascade offers on its summit a *divortium aquarum* proper to it where in part runs the boundary between Canada and Alaska, but there are many rivers which flowing from the Rocky Mountains, cut said Cordillera from one side to the other, in their course towards the Pacific.

Instances of chains of mountains, through the gaps of which the watercourses pass, are very common in every part of the world. The waters shed down both slopes of the Lebanon flow into the Mediterranean Sea. The eastern streams open a passage through the chain and, afterwards, running westwards, show that the watershed produced in the crest of the Lebanon is independent of the interoceanic hydrographic basins.

But there is no need to go out of Chile to find chains of mountains pierced by waters. The Cordillera called “de la Costa” presents a striking example. Its crest divides the waters, and so it is acknowledged by the Decree of the Chilian Government, dated November 4, 1885, in which it is enacted that the “watershed” of that Cordillera shall serve as the boundary to the internal political sub-divisions.* It is moreover a well-known and ascertained fact without doubts or discrepancies, that “the chain is frequently cut by rivers which force their way between the mountains as they flow towards the sea.”†

Why should there not occur on the Andes, to the south of Mount Perihueico, the same fact that is to be observed in the Cordillera de la Costa in Chile, in the Cordillera Real de Bolivia, on the Cascade Cordillera, on the Transylvanian Alps, on the Lebanon and on so many other chains?

The Cordillera de los Andes and the Cordillera de la Costa run in a parallel direction for some distance in which the former is mediterranean and the latter littoral. From the place where the Cordillera de la Costa loses itself in islands and archipelagoes, that of the Andes changes from an inland into a coast

* Anibal Echeverría y Reyes, *Geografía Política de Chile*, Santiago, 1888, vol. 1, p. 71.

† Barros Arana, *Geografía física*, 1st ed., p. 301.

Cordillera. Why should there not be produced on the latter the geographical phenomenon observed on the former?

It has already been said, that the expedition of Ladrillero (1557–1559) and that of José García (1766–1767) had confirmed the fact that the Cordillera de los Andes is pierced through by watercourses.

The existence of breaches traversed by watercourses has been corroborated by repeated expeditions already described, among others, that of the ‘Adventure’ and ‘Beagle,’ those of Señores Cox, Frik, Musters, Vidal Gormaz, Simpson, that of the officers of the Chilian gunboat ‘Magallanes,’ those of Señores Bertrand, Steffen, etc.

Chilian geographers and statesmen admitted the conclusions drawn from the account of these expeditions and expressed approval thereof in their books.

Among the former, Domeyko wrote :—

“In the expedition of 1871, conducted by the commander of the ‘Chacabuco,’ Señor Enrique Simpson, the Cordillera de los Andes was completely traversed through the river and transversal valley of the Aysen, in lat. $42^{\circ} 25'$, and further south another easy pass was found through the valley of Huemules, lat. $45^{\circ} 6' S.$ ”

Among the latter, Matta repeated, at the time when Chile disputed Patagonia :—

“On the southern frontiers, one does not see, although it may be indicated, the continuous backbone of the Andes, which there becomes lower and interrupted, and until a short time ago was thought to be more broken up than it really is. Recent explorations have in great measure confirmed that belief, as may be seen by the diary of his journey by Commander Enrique Simpson, which proved that the river Aysen, at lat. $45^{\circ} 25' S.$, crosses the Andes.”

Señor Serrano Montaner, of the Chilian Navy, made important expeditions to the river Palena, which led to the same result. The geographical and scientific journals of Europe, as has been said, dealt with the matter, stating the fact that the continental *divortium* was produced on the plains, outside the Cordillera de los Andes.

It is seen therefore that when the continental *divortium* is said to retire from the main chain of the Andes and from the Cordillera itself, it is only repeating what explorers, geographers and public men of Chile have asserted. Besides, this fact was recognised by the same Chilian Government, when in 1872 they published the plan already mentioned in p. 128, in which the river Puelo is shown cutting through the Cordillera, and when in 1889, through their Minister

of the Interior, they said in a message to Congress, that the river Buta-Palena traverses the Cordillera de los Andes in its course.

The Argentine-Chilian boundary line which, according to unmistakable stipulations, must be marked out on the Cordillera de los Andes and on its main chain, cannot follow on the plains, far from the line of snows and ice, the sources of rivers. The scheme which does follow them is contrary to the Treaties and cannot even be taken into account as such.

9. ON THE SIDE OF THE ARGENTINE REPUBLIC THERE IS MORE FACILITY OF ACCESS TO THE WATER-PARTING LINE.

As has already been seen, the Cordillera de los Andes, as the political boundary of the Argentine and Chilian sovereignties, has been imposed by tradition and by Nature. It has not been the outcome of abstract schemes.

In the old colonial times, the Kings of Spain, in apportioning political jurisdictions, were careful in settling upon boundaries which should serve as barriers to contentions among the representatives of their authority. Epochs of conquests and military expeditions demanded bulwarks difficult to scale and adequate to restrain the ambition of explorers and soldiers. America was looked upon as an inexhaustible source of wealth, and those who went forth to seek it had to be confined within circumscribed areas, so that in their desire to attain their object they should not encroach upon contiguous territories where other expeditions were striving after the same ends. The sea, the great rivers, the mountains, were the practical embodiment of the design of monarchs; they represented the barrier sought for against attempts at territorial expansion.

Whilst South America was subjected to the Spanish crown, the same political view was put in force, although in some cases its application suffered by reason of geographical ignorance. The conquerors of Chile crossed over the high barrier of the Andes, and had jurisdiction over the province of Cuyo, but at that period supreme authority over the southern half of South America was exercised by the Viceroy of Perú, whose official seat was at Lima. His rule extended over all the Spanish colonies mentioned, and neither seas nor rivers nor mountains limited it. But, in the inland subdivisions the above indicated

principle held good, and in spite of its being subject to Chile and Perú, the province of Cuyo (Mendoza, San Juan and San Luis) in its character as province, was confined on the west by the upper crest of the Cordillera.

The erection of the Viceroyalty of the "Rio de la Plata," August 1, 1776, modified this condition of things. Cuyo was added to it. The necessity for separating by actual obstacles the different boundaries—especially that of the new Viceroyalty from the ancient one of Perú—being thus again recognised, the highest crest of the Andes was interposed between them.

When the South American nations attained their independence the analogous principle was maintained. Their boundaries were to be the same as at the time of their emancipation. The Argentine Republic and Chile expressed this principle in their compacts, particularly in Article 39 of that of 1856.

It has been already stated that in numerous documents of Chilian origin, the boundary line of the Andes was considered an excellent boundary, and its qualities in representing an obstacle, a barrier, a wall, a natural fortification, were extolled.

The fact that the Cordillera, being a safe and an insurmountable boundary, was a boundary not to be improved upon, controlled Government Councils and diplomatic negotiations. It was never thought advisable to relinquish the advantages of this natural frontier in order to search for artificial schemes on paper. The spirit which pervades the Treaties is that of reaching this conclusion: "Chile, west of the Cordillera de los Andes, in her own territory: the Argentine Republic, east of it, in her own territory." In these words the plan of the Chilian statesman, Don Manuel Antonio Matta, was given expression to (except with regard to the terminal point of the orographical boundary), and it was founded on the same grounds just mentioned. As before said (p. 69), reasons of continuity, contiguity and facilities were invoked by Señor Matta to prove that the Argentine Republic should, in justice, retain her territory east of the line, "real or ideal," of the Andean summits.

These reasons of contiguity, continuity and facilities have been set aside in the frontier line projected by the Chilian Expert. The continental *divortium aquarum* traverses plains which are an uninterrupted continuation of the Argentine Republic, and the boundary line proposed along it does not take any heed of the obstacles, the barriers, the walls which have at all times been taken into account.

On the other hand, this same divide is separated from Chile by the

Cordillera de los Andes which, of difficult passage on all occasions, is impossible to cross during the greater part of the year.

The Chilian Representative recognises this difficulty and tries to explain some of the causes which produce it. He has forgotten, however, the principal one. To reach the interoceanic divide of the hydrographical basins, starting from the Pacific side, one is obliged to climb up to the summit of the Cordillera de los Andes, and then to descend the eastern slope, crossing several secondary chains.

Señor Simpson's account is suggestive from this point of view. He depicts in vivid colours the hardships of his various attempts to pass over the Cordillera de los Andes at the points where the Rio Aysen cuts through it, and when success crowns his efforts he prides himself upon it, describing the expedition he had carried out as a *great exploit*, and adding that it had tried to the utmost the courage and endurance of the travellers. The hardships experienced by Dr. Steffen are known when crossing the Cordillera de los Andes during his investigations on the continental divide.

The line of the continental divide which the Chilian Expert proposes would consequently unite his country with valleys and plains on the other side of the obstacle, the barrier, the wall, and separated from the remainder of the territory by the chain of mountains, the crossing of which is a *great exploit* to be effected only by courage and endurance tried to the utmost.

In such a case it would not, properly speaking, be any longer a question of boundaries dividing neighbouring States. The line of the main chain of the Cordillera de los Andes being set aside, Chile would exercise dominion over a kind of colony isolated from it by torrents, glaciers and mountains, and set in Argentine soil, in the midst of the latter's territory.

This result, as contrary to the letter and the spirit of the Treaties as to the most fundamental rules governing all boundary demarcation, is that which has necessitated the statement that the Cordillera de los Andes is the boundary, that dominion extends to its main chain, and that in the said Cordillera alone—never outside of it—can the Experts' divergences, submitted to Her Britannic Majesty's Government, be located.

It is not a question, as the Chilian Representative seems to believe, of investigating the relative difficulties presented by the ascent of the Cordillera de los Andes by one or other of its slopes. If differences do exist in this respect they in no way affect the controversy, provided that the boundary line should be marked out along the upper edge of the range. The question is, how to ensure

that neither of the nations should, setting aside the Treaties, incorporate under her dominions the pampas and valleys situated on the other side of the mountains, and to reach which not only the difficulties of the ascent but also the difficulties of the descent would have to be overcome. In other words, the question is, how to prevent the territories east of the main chain of the Andes—and which the Covenants describe as Argentine—coming to form part of Chile, which would be unable to reach them without effecting the *great exploit* spoken of by Simpson, of crossing the “great chain of the Andes.”

The Argentine Republic, as is seen, is not disputing over a peak, a crag, or a rock. She is simply defending her territorial integrity.

10. THE *DIVORTIUM AQUARUM* IS NOT A PERMANENT LINE.

When the Treaties determined the Argentine-Chilian Boundary, they did so, among other reasons, because they considered it to be an immovable boundary (1881 Treaty, Article 6 ; 1896 Agreement, Preamble). The orographical boundary combines all the conditions of permanence and stability which it is possible to wish for. Human action is powerless to alter it, though it may, with great effort, make breaches in it. In speaking of immovable boundary, the absolute stability in the midst of all the upheavals of the globe and all geological periods is, of course, not referred to. What is meant is the stability maintained in spite of the works of man and in spite of the common and everyday phenomena of Nature.

The line of the *divortium aquarum* is not an “immovable boundary” in Patagonia. Ordinary artificial means may, in some regions, cause it to vary. It is modified in some others by the physical action of the elements.

This is so evident that the Chilian Representative has admitted it in the case of localities where in some seasons perhaps the waters flow towards the east and in others towards the west, though he maintains “that these facts are exceptional and inconsiderable,” and that “if they extend to a hundredth part, or perhaps less of the whole boundary extent, that does not impair the general fact of the *divortium aquarum* being a permanent line.”

This single phrase suffices to disprove the doctrines of the Chilian Representative. He has not denied that the boundary line should run along the main

chain of the Andes, but he considers that this main chain is the line of separation of the continental waters. He now admits the possibility of the waters flowing at one season towards the east and at another season towards the west ; he admits consequently that the point where the continental divide occurs is changeable : that is to say that the main chain of the Cordillera de los Andes is found at one place in summer and at another place in winter. Comment is not needed. Though this circumstance may take place only at one point, the theory which leads to this alteration in the nature of a mountain range, according to the change of seasons, is a theory which does not stand the most superficial analysis.

This is not all, however. The Chilean Representative adds : “ That even if in the flat regions of the *divortium aquarum* it should be necessary to agree on sections relatively very short of artificial boundary line, these sections would surely be fewer in number and shorter in extent than in any other line or than on the geographical lines of the 52nd parallel and Tierra del Fuego meridian.”

It may be inferred from this passage that the interoceanic divide occurs at times in flat regions—a fact which does not agree with the notion of a main chain of mountains, especially so if it be considered that, as the same Chilean Representative says in another place : “ It must not be forgotten that a condition of general height is inherent to the idea of Cordillera.” It may also be inferred that the continental divide being applied to Patagonia, it would be necessary to seek for an “ artificial boundary line ” on some sections though relatively very short. It would, then, appear :—

1. That, at any rate in its entirety, the continental divide is not, as has been said, a natural boundary.

2. That neither is the tracing of such a line as easy and simple as had been also asserted ; and

3. That it departs from the rules which have prevailed in the Covenants and which called for an excellent boundary.

Moreover, the Chilean Representative supposes that, as a general fact, “ the river beds and water-divides are of a more permanent character than the purely orographical features.”

The only consideration which is adduced to prove this assertion is that many rivers are of more ancient origin than the mountains they intersect, and that their action of cutting channels through mountains is persistent and unrelenting, as proved by some remarks of Reclus, Garnett and Darwin.

Not one of these three authors has, however, said that the river-courses were more durable than the mountains; far from this, they refer to the work of the waters during the geological period of the formation of the mountains, and during the subsequent course of centuries. They state that many—not all—rivers persist in keeping to their old direction, and that precisely in order to reach this result, they alter their bed, hollow out a new one, change the temporary direction which they have adopted, until they re-establish the primitive one, but in a different channel, traversing perhaps different regions. The mountain, meanwhile, keeps its position and its nature, a new breach not altering or being capable of altering it. It is too insignificant a detail as compared with the bulk of its masses.

In the particular case of the Patagonian rivers, the copious rains occurring on one side of the Andes, and the atmospheric dryness on the other side constantly tend to alter the river beds and their directions, especially in the plain or in ill-defined undulations. The water-parting is movable: river branches disappear, streams vanish from view, or wind here and there, constantly modifying the interoceanic divide.

A typical example is offered by the river Fénix. Señor Moreno, in October 1896, before entering upon the functions devolving upon him as Expert, gathered in a book some of his observations and researches in Patagonia. He says:—

“This basin is dominated by the high mounts belonging to a massif covered with eternal snow, in the glaciers of which rises the Rio Fénix, which flows down close to the foot of the tableland in the depression between the two main lines of moraines (lines similar to those which I observed in Nahuel-Huapi, in Lake General Paz and in the other lacustrine depressions). This river, flowing towards the south-east, takes thousands of curves, according to the caprices of the morainic mounds, then abruptly bends to the west, to empty into Lake Buenos Aires after a course of more than 50 kilometres between the moraines, thus presenting another and the most interesting case of a watershed. The Rio Fénix, which formerly ran undeviatingly towards the Atlantic, was interrupted in its course by one of those phenomena common in the rivers running through loose, mainly glacial, soil. A fall of loose stones sufficed to divert a large part of its course, carrying the same to the lake—the outlet of which I am still unaware of—while on the east there is no water except during the great floods, when it overflows, and forms a small stream in the old channel—which is almost filled up at the present time—but a few hours’ work would suffice to cause these waters to resume their primitive direction, and all to flow towards the Rio Deseado. Old geographical maps describe the Rio Deseado as a voluminous river, and it is probable that this was the case when it was explored by the first discoverers, whose observations deserve in general more credit than is given them. I visited this river, or rather its old bed, in 1876, at the outlet in the port bearing its

name, and found only small springs, a phenomenon, the explanation of which is found in the fact already mentioned in the case of the Rio Fénix and in other analogous cases. If time had permitted it, I should have re-established the stream along its old channel, as the 'tomeros' (diggers) accomplish every day a more difficult work in the San Juan, Mendoza and other rivers, for the irrigation of their properties. If the Government should decide to form a colony at this place, it is my belief that it would not cost a penny to divert the waters of the Rio Fénix and those of the Upper Deseado river into the Atlantic, and the practical results of this work would be considerable, for if this fine port were made available, easy communication with the fertile Andean region would be established, and moreover, that bay to-day isolated would be converted into a military station of the first importance for the national Navy."

The views of Señor Moreno as to the facility of re-establishing the ancient channel of the Rio Fénix towards the Atlantic was subsequently confirmed by facts. The work of a few men during a few days sufficed to accomplish it. That work once done the Rio Fénix empties now part of its waters into the Atlantic through the Deseado, and the other part into Buenos Aires Lake, which through a river cutting the main chain of the Andes, has in its turn a direct outlet to the Pacific.

This fact demonstrates in a most conclusive manner that the line of the continental water-parting is far from embodying the character of immovability which the Treaties order, seeing that unimportant works may turn the course of a current and divert it from its position.

If the continental divide were the main chain of the Andes, it would be a very easy task to change its position. The few men who in a few days re-established the primitive course of the Rio Fénix succeeded in pushing back the line of separation of the water-basins many miles to the west, and it might therefore be possible to say, according to the definitions of the Chilean Representative, that the main chain of the Andes was removed from east to west and set in another place.

Under date of May 12, 1898, the Minister Plenipotentiary of Chile in Buenos Aires, with the intention of removing all disturbing elements from the boundary demarcation, wrote to the Argentine Minister of Foreign Affairs, regarding the diversion of the Rio Fénix, which he stated was of grave significance. In this note we read :—

"Through personal inspection, the Chief Commissioner, who visited the locality on February 21, confirmed the fact that at this date there existed a long trench or artificial diversion of recent construction, which carried away part of the waters of the Rio Fénix—the sole eastern affluent of Buenos Aires Lake, and belonging therefore to the water-basin

of the Pacific Ocean—towards the neighbouring bed of the Rio Deseado, which belongs to the slope of the Atlantic.”

The Chilian Minister requested that the facts be investigated, as there were circumstances which led him to believe that the authors of the diversion were members of the Argentine Boundary Commissions.

In reality, the assistants of the Expert re-established the course of the river, but they did not attempt to change the position of the Cordillera de los Andes up to which the Argentine Republic on the east and Chile on the west retain their dominion and sovereignty, according to the interpretation given to the Boundary Treaty by the negotiators of the 1893 Protocol (Article 2).

At any rate the line which passes through the sources of the rivers is fixed and permanent in some cases, and, as in Patagonia, excessively variable in others. A flood, the influence of rains, land-slides, etc., so substantially alter its position as to make it impossible to affirm that the continental divide of to-day is to be found in the same place in which it was twenty years ago. It is clear, therefore, that this is very far from being the immovable boundary of the Treaties.

CHAPTER XVI.

- Summary*—1. COMPARISON BETWEEN THE ARGENTINE AND THE CHILIAN BOUNDARY LINES. GENERAL CONSIDERATIONS.
2. THE PROPOSED ARGENTINE LINE FROM A GEOGRAPHICAL POINT OF VIEW.
 3. THE PROPOSED CHILIAN LINE FROM A GEOGRAPHICAL POINT OF VIEW.
 4. THE PROPOSED ARGENTINE LINE FROM A POLITICAL, ECONOMICAL AND ADMINISTRATIVE POINT OF VIEW.
 5. THE PROPOSED CHILIAN LINE FROM A POLITICAL, ECONOMICAL AND ADMINISTRATIVE POINT OF VIEW.
 6. CAUSES WHICH LED TO THE DIFFERENCES BETWEEN BOTH LINES.
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1. COMPARISON BETWEEN THE ARGENTINE AND THE CHILIAN BOUNDARY LINES. GENERAL CONSIDERATIONS.

It has been considered advisable to make a comparison between the proposed Argentine and Chilean lines, so as to render apparent the very marked physical and political differences between them.

This comparison is submitted to the Tribunal as the commencement of a series of demonstrations that are about to be made, which are, however, unavoidably lengthy because they deal with investigations carried out over an extension of twenty-nine degrees of latitude, in which extension the production beforehand of this comparative statement, which might properly be called a synopsis of the questions submitted to the Arbitration of Her Britannic Majesty's Government, will greatly facilitate the consideration of the descriptions and quotations which will follow.

This comparison, besides, embodies the strongest evidence on the justice of the Argentine claims. In the next chapters will be expressed in detail the manner in which both Experts have carried out their line, and the deductions to be derived therefrom will even greatly fortify, if that were necessary, those claims.

It is needless to repeat that the general frontier line proposed by the

Argentine Expert to his Chilian colleague at the meetings of August 29 and September 1 and 3, 1898, is in complete accordance with the stipulations of the Treaties of 1881 and 1893 and of the Agreement of 1896 ; that the boundary settled by these Treaties is the same one as that which, in 1810, divided the Capitanía General de Chile from the Virreinato del Rio de la Plata ; that since their independence Argentina and Chile recognised as their mutual boundary the summits of the Cordillera de los Andes ; that this boundary has the sanction of history ; that the nations which have made Treaties with the two countries have taken it to be such ; that the Treaties of 1826, 1856 and 1881 proclaimed this same jurisdiction by the Argentine Republic, in the same way that these same Treaties recognised Chilian jurisdiction over the western slope of the Cordillera ; and that the Protocol of 1893 ratified the said boundary line by stipulating that the divisory line must run along the summit of the main chain of the Andean Cordillera, recognising that the lands situated to the east of that summit are Argentine patrimony.

" Claims of territory are claims of a most sacred nature," and therefore must be always based on indisputable rights. Thus the Argentine Expert, when proposing the boundary line along the summit of the Cordillera, did not lay claim to any extension westwards of the territory inherited from Spain ; when formulating his proposal, he had in consideration the mutual advantages to be gained from the truthful application of the Treaties ; he had in view the best embodiment of the law of self-preservation, viz. the Andean wall. The Argentine Republic, at the moment when the Treaty became definitive, was in lawful possession of the whole eastern side of this wall down to the neighbourhood of the Straits of Magellan, that is to say, to the east of the traditional boundary, unique on the globe in its strongly pronounced features, whose immutable profile leaves no ground for dispute, and which imposes itself upon the two countries. To pretend the contrary, to leave aside the barrier of the Andes, the *arcifinious* boundary, in order to carry the line along the eastern side of it, along the undefined water-parting of the rivulets, tributaries of the Atlantic and Pacific Oceans, is to modify the laws of Nature and the teaching of history. The Chilian Expert, however, has chosen this course.

The Argentine Expert, when applying the Treaties on the ground, has been enabled to leave in Chile the territories in the Cordillera de los Andes of which Chile had possession,* and over which she was exercising jurisdiction when the

* The precarious occupation for sanitary purposes of insignificant places in the Puna de Atacama is not taken into account, this region being subject to different rules.

Treaty of 1881 and Protocol of 1893 were framed. All the territories to the east of the summit of the said Cordillera that were always under the exclusive political control of the Argentine Republic have been considered as Argentine, because such sovereignty is incontestable according to the law of nations. The Treaties of 1856 and 1881, the Protocol of 1893 and the Agreement of 1896 stipulate arbitration between the two countries; but this was not an unrestricted arbitration. Sovereignty could not be included in it. The British Government has stated that nations cannot submit to arbitration those controversies by which their *status* may be affected, or a number of their subjects transferred to a foreign rule.* The Argentine Expert, when planning his line at Santiago, has not departed from this eminent opinion. The Argentine Republic has never claimed any portion of foreign territory, to incorporate foreign subjects under her rule.

The Chilian line, in that section which has been submitted to Her Britannic Majesty's Government in the hypothesis that it is located within the Cordillera de los Andes (and this is contradicted by the Argentine Expert with regard to the greater part of it), is the most complete negation of the Treaties and international Agreements. In the Argentine line there is nothing to object to from the point of view either of its physical aspect, or of its political character. The idea held by the Chilian Expert when tracing the divisory line in Patagonia is a thorough geographical error, and, moreover, extraneous to all the requisites for a good natural frontier.

Plate X. will show clearly which of the two lines is the more natural, the more regular in its direction and the more logical. The Argentine line measures, from parallel 23° to 52°, 2390 miles. It runs along the practically inaccessible crest of the Cordillera, and where that line cuts the rivers flowing across the range from Eastern Patagonia to the Pacific, it passes over narrow gaps where the water runs in rapids and cascades. The Chilian line runs capriciously; one half of it along the lofty Andean crest, and the other half along the serpentine continental water-parting in Patagonia. As regards the northern part, it cuts across rivers; and in the southern it searches for the origin, more or less constant, and never easy to distinguish, of the waters that feed the streams abnormally tributaries of the rivers flowing into the Pacific

* The Marquess of Salisbury to Sir J. Pauncefote, March 5, 1896, in correspondence between the Government of Great Britain and the United States with respect to proposals for arbitration.

from the plains or from the eastern slope of the Cordillera, and it measures 2825 miles. The difference between the two lines is 435 miles.

Comparing the Argentine line south of parallel 40° S. lat., a line which is almost 930 miles in length, with the same Chilian line having a length of 1300 miles, it results that the latter is 370 miles longer in the flat country, thus showing the impossibility of its becoming a safe frontier, *easy to distinguish and difficult to cross*. In a word, the Chilian proposed boundary is an unnatural frontier.

In the following paragraphs the general differences between the two lines will be considered, and some of the causes which led to the disagreements of the Experts will be explained.

2. THE PROPOSED ARGENTINE LINE FROM A GEOGRAPHICAL POINT OF VIEW.

The proposed Argentine line runs from north to south, from lat. 23° to 52° S., along the main chain of the Cordillera de los Andes (except in the case of the Bio-Bio valley), and passes along its lofty ridges, which divide the waters of one slope of the said Cordillera from those of the other. The line is in strict conformity with the Treaty of 1881 and the Protocol of 1893.

The *main chain* and its high ridge are the same as those indicated by all geographers, travellers and surveyors who have studied the ground, viz. Darwin, Gay, Domeyko, Pissis, Mujia, Bertrand, San Roman, Burmeister, Brackebusch, etc., as well as the Chilian Expert, Señor Barros Arana.

The line proposed by the Argentine Expert, after the surveying of the ground by himself or by his assistants, is the line known and officially recognised by Chile in her Constitution, in her Treaties, and in her administrative laws for the division of the national territory into provinces; it is also the line to be found in all the Chilian documents under the names of *culminating line of the Andes*, *summit of the Cordillera de los Andes*, *formidable barrier*, etc.

This line may be divided, for the sake of comparison, into the following sections :—

Section A: From Parallel 23° to $26^{\circ} 52' 45''$ S. lat.—This section runs over the same Cordillera and summits which the Treaties between Chile and Bolivia determined as the boundary, and which Pissis, the Chilian Surveyor, indicated as the frontier between those countries in 1870.



Argentine Boundary Line.
Chilian Boundary Line.

Y 1 Valle F.R. 554
[Part p. 497.]

DIAGRAMMATIC SKETCH
SHOWING THE PROPOSED ARGENTINE AND CHILIAN BOUNDARY LINES

The Argentine Commissions have surveyed this whole section, and, as a result of their information, the Argentine Expert proposed that landmarks should be placed in the points numbered 1 to 61 on the Section A, Plate XI. The lowest gap in this line is 12,812 f. (3905 m.), and the highest peak, Llullaillaco, 21,720 f. (6620 m.). This section of the line does not take in a single inch of land or water which at any time had appertained to the Chilian nation ; it is, moreover, a true barrier, owing to its physical features.

Section B: From $26^{\circ} 52' 45''$ to $32^{\circ} 3' S.$ lat.—In this section the line follows the main chain of the Cordillera de los Andes, recognised as such by Pissis, Domeyko, Darwin, Schmidtmeier, Caldcleugh, Miers, Gillies, Gay, Burmeister, San Roman, Brackebusch, Barros Arana, and others, and which is the same as the "*summit of the Andes*," acknowledged and decreed by the Government of Chile to form the boundary line between the Chilian provinces of Atacama and Coquimbo, and the Argentine provinces of Catamarca, La Rioja and San Juan.

In this section high mountains are to be found in lateral chains, outside of the main range which contains the predominant mass, within the Cordillera de los Andes.

The line does not cut off any portion of the traditional territory of Chile, respects all her possessions, is in full accordance with the Treaties, and has been accepted by the Chilian Expert, with the exception of the points numbered 1 and 2 in the Argentine map, which meanwhile, according to Chilian geographers, are situated in the main chain of the Cordillera de los Andes. The lowest gap is 11,483 f. (3500 m.) ; the highest peak is Mount Tres Cruces, 22,245 f. (6780 m.). The boundary marks are shown on Plate XI., by numbers 1 to 108, Section B.

Section C: Valley of los Patos (from $32^{\circ} 3'$ to $32^{\circ} 33' S.$ lat.).—Between the two principal ridges which form the Cordillera de los Andes, is to be found, in $32^{\circ} 3'$ to $32^{\circ} 33' S.$ lat., a large depression called the valley of los Patos (worthy of notice as having been claimed by both Chile and the Argentine Republic). This valley is bounded on the west by the main ridge which forms the watershed of the Cordillera, a ridge through which are several gaps, the lowest being the Yaretas, 10,745 f. (3275 m.) above the level of the sea. The eastern ridge is cut through by waters which, for the most part, flow from the main ridge, and from Mounts Mercedario, Ramada and Aconcagua, forming the Rio de los Patos, an affluent of the San Juan, which runs to the east, but does not reach the Atlantic. The valley is of easy access to anyone coming from the east, that is to say, from the

Argentine side ; from very early times its gorges have been occupied by the aborigines, whose buildings still remain, although in ruins.

The western ridge has, from the time of the Spanish conquest, been considered as the true boundary, being the continuation of the same ridge in whose northern part are to be found all the traditional passes, as has been stated by historians and by all the geographers who have surveyed that region, such as Pissis, Domeyko, Burmeister, San Roman, Brackebusch, etc.

In accordance with this historical evidence, with his personal examinations, and the surveys of his assistants, the Argentine Expert proposed to his colleague the boundary line passing over the western ridge, which he considered as forming in that district the main chain of the Andes.

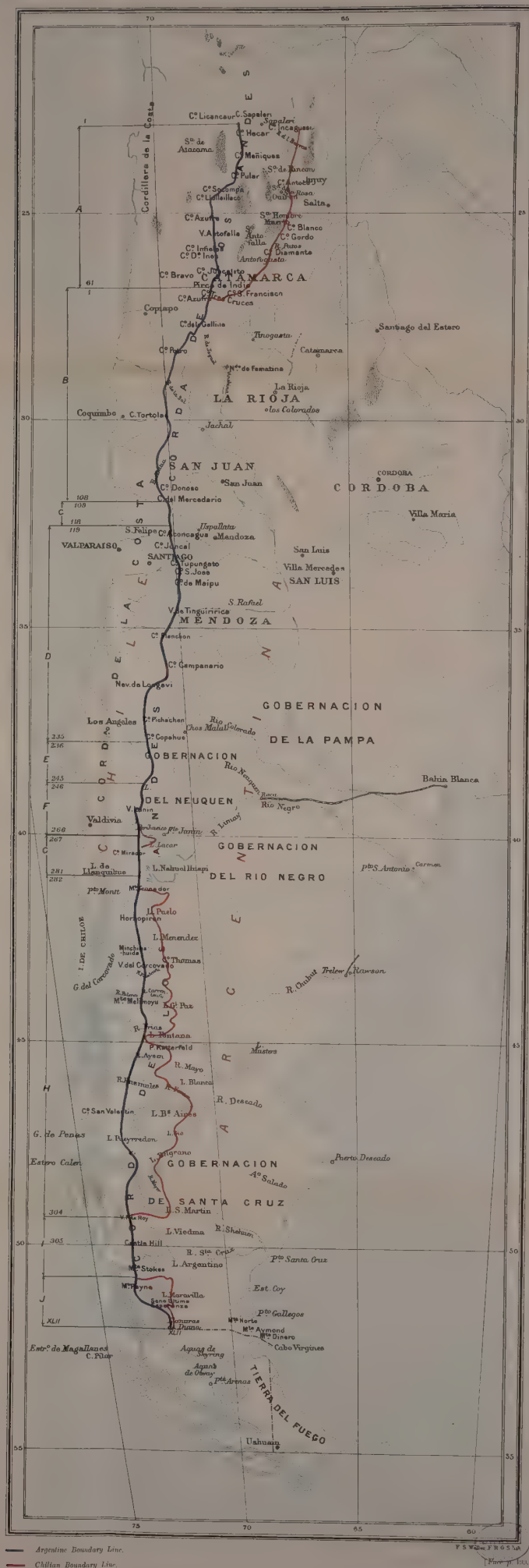
Argentine Customs and Police posts are established at the eastern foot of this western ridge. Notwithstanding this, the Chilian Government for a long time claimed this valley, both before and after the signature of the Treaty of 1881 and of the Protocol of 1893, but the Chilian Expert has recognised the just rights of the Argentine Republic over the valley, and has consequently agreed that the boundary marks are to be placed at the gaps and accessible points of the western mountain ridge, i.e. in the main chain.

The principal landmarks are numbered 109 to 118, Section C, Plate XI.

Section D: From Parallel $32^{\circ} 33'$ S. lat. (where the Valley of los Patos ends) to 38° S. lat. (Mount Copahue), where the Upper Valley of the River Bio-Bio begins.—The line follows the visible and unmistakable main chain of the Cordillera de los Andes.

The Argentine surveys have confirmed the unanimous views and opinions of surveyors, geographers, and travellers, who are undoubted authorities on the subject. There are in this section some of the better known passes of the Andean Cordillera, such as la Cumbre, la Iglesia, 12,608 f. (3843 m.), Bermejo, 12,746 f. (3885 m.), Piuquenes, 13,222 f. (4030 m.), crossed by Darwin, Maipu, 11,433 f. (3485 m.), crossed by Gussfeld, Las Damas, 9514 f. (2900 m.), and Planchon, 9586 f. (2922 m.), one of which will be selected for the trans-Andine railway, as well as the Antuco or Pichachen, 6608 f. (2014 m.), which is another international route. It has for centuries been the most frequented region of the Andes, both by Argentines and Chilians, and this high summit of the Cordillera has been generally recognised as the frontier.

The boundary line in this section coincides with the "Cumbre de los Andes," or "Cumbre de la Cordillera," which the administrative laws of Chile indicate as



DIAGRAMMATIC SKETCH SHOWING THE ARGENTINE
AND CHILIAN LANDMARKS IN SECTIONS A TO J OF THE RESPECTIVE BOUNDARY LINES.

the eastern boundary of the Andean provinces, and is the same line as that proposed by the Chilian Expert. The Argentine Expert has agreed to it, taking into account, in reference to the stretch between Las Damas Pass and Copahue Pass, that the country in the upper valleys of the rivers Teno, Claro, Maule, Ñuble and Laja presents features analogous to those of the valley of los Patos.

In the Argentine line this portion (already finally settled) bears the numbers 119 to 235, Plate XI.

Section E: From 38° S. lat. (Copahue Volcano) to 38° 52' S. lat. (Pass of Santa María) enclosing the valleys of the Upper Bio-Bio.—The Cordillera here bifurcates. Two chains of it enclose the upper valleys of the river Bio-Bio, and the Experts, according to Article 1 of the Treaty of 1881, and Article 3 of the Protocol of 1893, only in these cases of bifurcation were empowered to decide by themselves which of the two chains would form a boundary most consistent with the interests of the two countries. In all other cases they ought to follow the *main chain of the Cordillera*.

In this section the access to the valleys enclosed between the two chains is found to be very easy from the *western side, that is to say, from Chile, and through the western chain*. The population of the valley is Chilian, the Police posts are Chilian, while the Argentine posts are in the eastern slope of the eastern chain. The occupation by Chile of the valley Bio-Bio, and the erection of its block-houses, contemporary with the Treaty of 1881, is to be attributed to the belief shared at that time by both nations, that *the eastern branch* of the bifurcated Cordillera constituted the *main chain* where the boundary was to be marked out. Even the Indians themselves supported that belief, as is proved by the fact that the Araucanian tribes were to the west of the eastern chain, and the so-called Pampas, or Mapuches and Pehuenches tribes were to the east of it.

The Argentine army, when fighting the Indians, never crossed that chain; and, the campaign over, when they occupied the territory, Argentine military forts and Police and Customs posts were established in the pass of the said *eastern chain*. Never has the Argentine Republic had settlements in the Bio-Bio valley, nor dominion over the same, and on the other hand, never had Chile held dominion or settlements to the east or to the south of the Arco Pass.

In view of these facts, and using the powers conferred on him by the Treaties, and notwithstanding his opinions, based on his personal knowledge of the region, that in the *western chain* was to be found the continuation of *the main*

chain of the Cordillera coming from the north, the Argentine Expert left to Chile the valley of the Bio-Bio, and traced the boundary line over the high ridge of the eastern chain, which not only is difficult to cross, *but is the best one to form the frontier between the two countries.*

This line is the traditional one, does not take from Chile any portion of land or water, coincides with the Chilian line, and now constitutes a part of the boundary definitely settled. The Argentine landmarks bear the numbers 236 to 245, Section E, Plate XI.

Section F: From Parallel $38^{\circ} 52'$ S. lat. (Santa María Pass) to $40^{\circ} 5'$ S. lat. (Mount Perihueico), where the Chilian proposed line again commences to encroach on Argentine Territory.—The line follows the main chain, and coincides with the Chilian line. There are some good passes by which the Cordillera can be crossed in the summer season, but their existence has never been invoked by Chile, either to dispute the *eastern slope*, or to establish in it settlements or colonies.

The boundary follows the “Cumbre de los Andes,” referred to in the administrative laws of Chile. The numbers of the landmarks in this section are 246 to 266, Plate XI.

Section G: From the beginning of the first southern Chilian encroachment on Argentine Territory as far as Perez Rosales Pass, in the main chain, according to both Experts; Parallels $40^{\circ} 5'$ to $41^{\circ} 10'$ S. lat.—In this section the line leaves to the Argentine Republic the lands and waters on the eastern slope of the main chain of the Cordillera de los Andes, viz. Lake Lacar, the land on its borders, and that part of the Huahum River, from the point where it cuts through the Cordillera de los Andes at the foot of Mount Perihueico, until where it takes its rise in Lake Lacar, which, according to all Argentine surveyors, and to the Chilian and foreign authorities, Señores Frick, Cox, Siemiradzky, Krüger, and Steffen, is situated to the east of the main chain of the Andes.

The eastern portion of the River Huahum, Lake Lacar, *and valleys to the east of the summit of the Cordillera have never been occupied or claimed up to 1898* by Chile, although official and private Chilian surveys had shown that the waters of that region flow into the Pacific Ocean. *The fact thoroughly confirmed that both here and further to the south, the main chain of the Cordillera was intersected by rivers, and the opposition of the Chilian Expert to cut those rivers with the boundary line, gave rise (as has been said) to the Protocol of 1893.*

In this region, the main chain of the Andes is extremely difficult of access, and *there is no bifurcation, nor any lateral chain to the east of the Cordillera.*

The Argentine army, in the commencement of 1881, before the date of the Treaty of that year, only found in that region Indian tribes, which were dispersed, and since then Lake Lacar and lands and waters in the neighbourhood have been occupied by Argentine settlements, and have been ruled by Argentine laws. All this was performed in the presence and with the full knowledge of the Chilian army and authorities, which were at that time on the western slope of the Cordillera, occupied in dispersing the Araucanian tribes, in establishing forts and Customs posts in order to consolidate the possession of the lands they had conquered, and in guarding the passes leading to the eastern side. Plate XII. completes these remarks, and shows graphically the military occupation of both slopes in 1881-83 by the Argentine and Chilian armies.

All the measures taken by the Argentine Government for the defence of the frontier, or for promoting the colonisation and development of that region, were made known by means of Laws and Decrees officially published. Amongst such measures mention may be made of the establishment of forts and military camps, Customs and Police posts, the navigation of the lake, the colonisation of a vast area around its borders, etc., and on no occasion has the Chilian Government called for explanations.

Consequently, Lake Lacar, the neighbouring lands, and the corresponding part of the river Huahum, have always been in the possession of the Argentine Republic, and are situated to the east of the *main chain of the Andes*, defined by the Chilian Government when fixing in the *Cumbre de los Andes*, the limits of the Chilian Province of Valdivia, which *cumbre* is exactly the same as that proposed by the Argentine Expert. Therefore, by so doing, not a single inch of the *Chilian territory is encroached upon*.

The numbers of the boundary marks in this section are 267 to 274, Plate XI.

Section H: From Perez Rosales Pass, where the greater encroachment of the Chilian line upon Argentine populated territory commences, to Mount Fitz Roy or Chalten, where both lines meet again, extending from 41° 10' to 49° 10' S. lat.—This section of the Argentine line has a length of almost 600 miles, and is shorter by nearly 310 miles than the Chilian line, the difference between both being, therefore, about a half of the extent of the former.

It is situated in the practically impassable boundary formed by Nature, which both nations have agreed to accept, and not one of its landmarks is outside the Cordillera de los Andes.

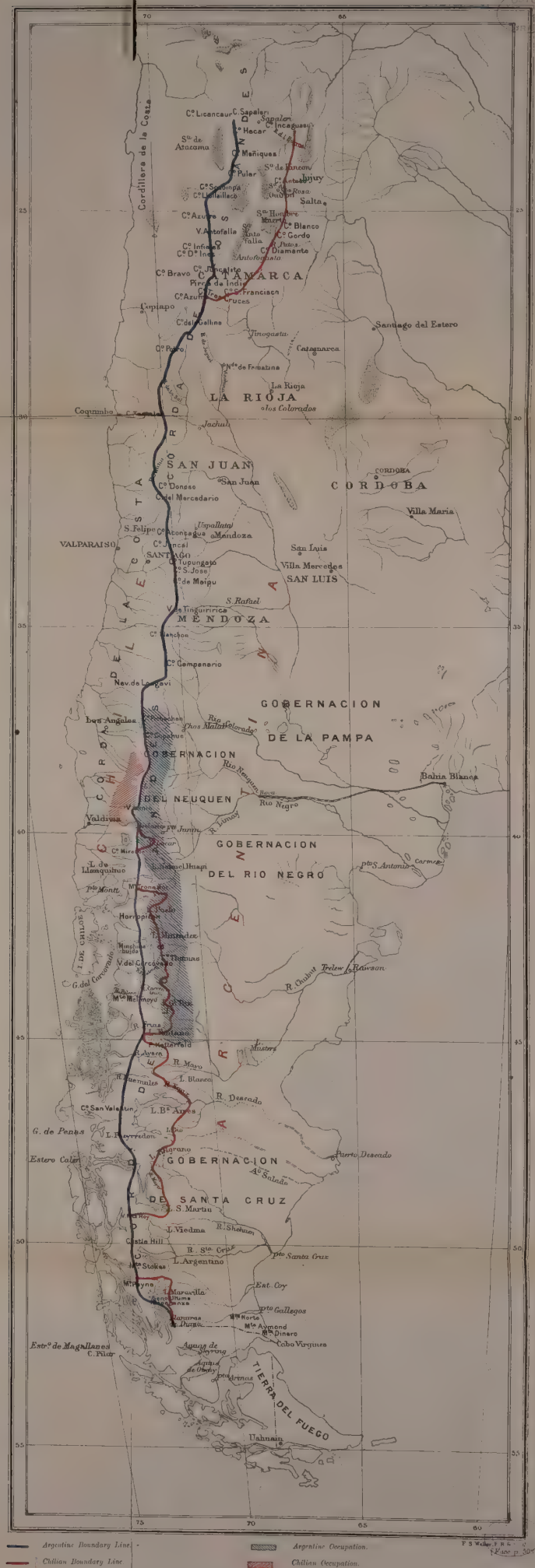
From Perez Rosales Pass, where the Chilian line again leaves the traditional

boundary, which is that of the Treaties, the Argentine line follows, as before, the *main chain* of the Andes, which is here very characteristic, and at some points is intersected by rivers which flow through narrow gorges from the eastern to the western slope of the Cordillera. Only once does the Argentine line abandon the main chain of the Andes, which is at Calen Inlet, where the range is almost intersected by the waters of the Pacific Ocean. The Argentine Expert there deviates south-eastward, the line coming from north to south, so as to cut Las Heras river at a waterfall, and to reach another lateral ridge, suitable to form a good frontier, leaving to Chile the whole coast of the inlet. The line following the summit of the said ridge, cuts the river Toro and turning to the south, reaches the *main chain* at Mount Fitz Roy.

The Argentine line as ordered by the Treaties, and always following over the principal chain of the Andes, divides those rivers, leaving as belonging to the Argentine Republic "the parts of rivers" flowing on the eastern side before cutting the chain, and leaving as belonging to Chile, "the parts of rivers" that flow on the western side after cutting through the chain.

The section of the Argentine line under consideration does not encroach upon Chilean territory, and respects each and every possession that Chile had before the Treaty of 1881, as well as after that Treaty. All the landmarks of this line are situated within the Cordillera, and not one of them has been protested against by the Chilean Expert. Attention is directed to this significant fact—that not one single landmark of the Argentine line has been found fault with as being outside the Cordillera de los Andes or outside its main chain, which proves that they are all placed according to the Treaties, and in the form by them established, that is to say: (a) They are placed in a north and south direction. (b) They are within the Cordillera de los Andes, and in the "principal chain of the Andes." (c) The landmarks are proposed to be placed *in the accessible points of the mountains*, and in its water-gaps, when the rivers cut the main chain. These gaps are impracticable as waterways, as may be seen in the accompanying figures of the rapids of rivers Puelo, Fetaleufú, Cisnes, Aysen and Las Heras. (d) They follow the mountains whose apex or anticlinal line divides the waters flowing from the highest crest and which run down its slopes on either side, that is "the chain of these mountains through which runs the most important and principal line dividing the waters."* (e) They are placed so

* Morla Vicuña, in Documentos, etc., before quoted.



DIAGRAMMATIC SKETCH SHOWING THE REGIONS MILITARILY OCCUPIED BY THE ARGENTINE AND CHILIAN ARMIES IN 1881-1883.

as to leave to each nation, as a part of its territory, that part of rivers which flow through their respective dominion to the east or west of the edge of the main chain of the Andes.

In fact the Argentine line in this section maintains the traditional frontier, and runs along the central or main chain of the Cordillera de los Andes, considered as such by all geographers and travellers of high authority who have visited these territories. The landmarks proposed by the Argentine Expert are indicated in Plate XI., with the numbers 278 to 304.

Section I: From Mount Chalten to Mount Stokes; From $49^{\circ} 10'$ to $50^{\circ} 49'$ S. lat.—This section of the line as a prolongation of the preceding one, follows a



GORGE OF RIO PUELO.

From *Viage y estudios en la Region Hidrográfica del Rio Puelo* por Juan Steffen, Santiago, 1898.

southward direction, and passes over the Cordillera de los Andes in its entirely snow-capped main chain. It agrees with the traditional boundary, has been planned in conformity with the Treaties, as explained above, and coincides with the Chilian line, which after great deviations from the Cordillera, runs again along it in this section, thus forming *one of the parts of the boundary line definitely settled*. No. 305, Plate XI.

Section J: From Mount Stokes $50^{\circ} 49'$ to 52° S. lat. in the meridian of long. $72^{\circ} 6'$ W.—The line follows a direct course over the *Cordillera Nevada* (snow-capped), which is the main chain of the Andes, from north to south down to $51^{\circ} 20'$, wherefrom it runs towards the proximities of the intersection of $72^{\circ} 6'$

long. west of Greenwich with 52° S. lat. Argentine landmark 306 in the Cordillera and XLII. in the parallel of 52° S. lat., Plate XI.

The line has been planned so as to leave in Chile the ports and coasts in the channels of the Pacific, and is similar to the line determined in the Treaty of 1881 to delimitate the territory bordering the Magellan Straits. North and east of these lines the Argentine Republic has sold lands where colonies are settled and authorities established, and on the other hand Chile has not been deprived of any one of her settlements.



GORGE OF THE RIVER FETALEUFÚ.

Had the Argentine line, as was first stipulated by the Treaty of 1881, followed the *divortium aquarum* of the Cordillera de los Andes, it would have penetrated into the channels coming from the Pacific Ocean, leaving thus a good portion of them as Argentine territory. It has been in strict compliance with Article 2 of the Protocol of 1893, that the line has been planned so as to prevent hereafter any possible encroachments by the Argentine Republic on the Pacific shores.

This section does not coincide with the Chilean line, as the latter has once more abandoned the Cordillera and run into the Patagonian plains.

3. THE PROPOSED CHILIAN LINE FROM A GEOGRAPHICAL POINT OF VIEW.

The proposed Chilean line entirely ignores the Cordillera de los Andes and its main chain, that divide the waters on one and the other side of the said Cordillera, and follows instead the continental divide, that is to say, the line which separates the waters flowing to the Atlantic from those flowing to the Pacific.

There can be found no historical or other evidence in support of that line, and it is entirely opposed to the Treaties in force and to the Chilean Constitution, as well as to the Treaties made by Chile with Spain and Bolivia. It is contrary to the Chilean administrative laws that have marked the "*linea culminante de los Andes*" or "*the cumbre de la Cordillera*," as the boundary of all the



RAPIDS OF THE RIO CISNES.

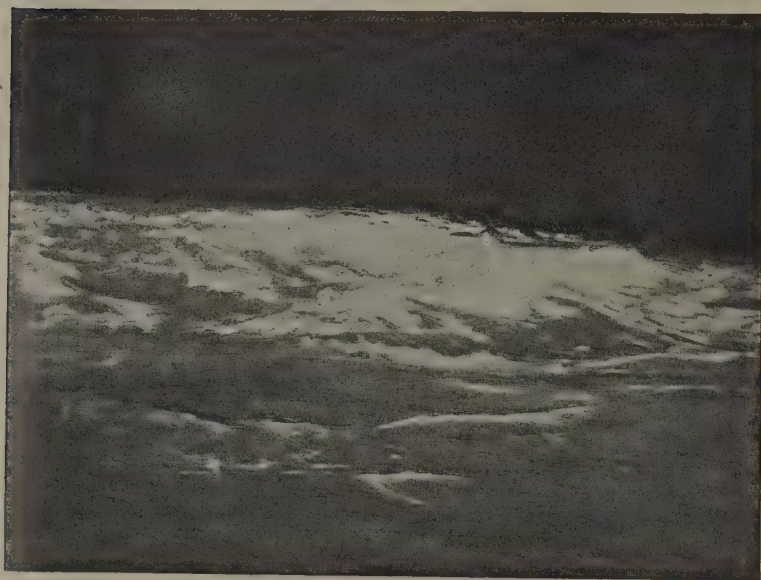
Chilean provinces situated near the western slope of the Cordillera de los Andes, and it is also contrary to the opinion of the ablest statesmen of Chile, to any scientific idea of a boundary in a mountain range, and to all political and economical considerations.

The proposed Chilean line will be divided for the sake of comparison into the following sections :—

Section A: From 23° to 26° 52' 45" S. lat.—The line *does not run over the Cordillera de los Andes*. It abandons the range that had from the earliest times divided, according to international Treaties, Chile and Bolivia, and runs over

the eastern chain called "*Cordillera Real de Bolivia*," which according to all geographers *is not the Cordillera de los Andes*.

To trace such a line, the Chilian Expert has been obliged not only to set altogether aside the Chilian Constitution, the Treaties and the binding declaration of the Government of Chile when acknowledging the Cordillera as the traditional boundary from north to south, but he has also been inconsistent with the very same continental divide, inasmuch as his proposed line over the *Cordillera Real de Bolivia* is intersected by the rivers Susques or Burras and Patos, leaving to



RAPIDS OF THE RIO AYSEN.

the west a part of those rivers and another part to the east, as has been recognised by the Chilian delegates to settle that section of the boundary, Señores Altamirano, Mac Iver, Zegers, Matte and Pereira.

This line would have given to Chile the tract of land comprised between the Cordillera de los Andes and the "*Cordillera Real de Bolivia*," which belongs to the Argentine Republic, as

was acknowledged by Bolivia when in 1893 old boundary controversies were definitively settled.

As this section is not in *the main chain of the Cordillera de los Andes*, the line cannot be the boundary ordered by the Treaties of 1881 and 1893.

The differences between the Experts in this section have not been submitted to Arbitration as they have been settled by special demarcators, in such a manner that the Argentine Republic retains the eleven-twelfths of the lands ascribed to Chile by her Expert. But the southern points of the two lines in that section form the first differences submitted to Her Britannic Majesty's Government.

Section B: From 26° 52' 45" to 32° 3' S. lat.—The line between the proposed

landmarks 1 and 9 of the Chilean enumeration, is altogether outside the Cordillera de los Andes, and besides it starts from the Portezuelo de San Francisco, which is on the eastern slope of the intermediate chain between the Cordillera Real de Bolivia and the Cordillera de los Andes, and is acknowledged by Chilean geographers to be situated outside the *main chain of the Cordillera de los Andes*. The portion from *San Francisco* to *Tres Cruces* is therefore traced in opposition to the Treaties of 1881 and 1893, and consequently the landmarks 1 to 8 cannot



RAPIDS OF THE RIO LAS HERAS.

indicate the boundary line between the two nations. No evidence exists in support of it, and by its adoption a tract of territory belonging to the Argentine Republic would be taken.

From Tres Cruces the line follows the *Cumbre de los Andes*, in the same manner proposed by the Argentine Expert, it agrees with the administrative laws of Chile which delimitate the eastern boundary of her Andean provinces, and coincides with the main chain of the Cordillera, defined as such by the Chilean geographers.

Section C: From $32^{\circ} 3'$ to $32^{\circ} 33'$ S. lat. (Valle de los Patos).—As previously stated, the Valle de los Patos is enclosed between the two ridges which con-

stitute the Cordillera. Notwithstanding that the valley has no easy access from the western, that is to say from the Chilian side, notwithstanding the opinion of Pissis that the western chain was the boundary with Argentina, and notwithstanding the Chilian Expert's proposed continental divide boundary line, the Government of Chile repeatedly claimed Valle de los Patos before the Treaty of 1881 and after the Protocol of 1893, the last occasion being in 1894, when they requested the annulment of territorial taxes which the Government of the Argentine province of San Juan had imposed on the lands of the said valley. These claims were always refused by the Argentine Government, as Chile, since the erection of the Virreinato del Río de la Plata, the boundary of which was the summit of the Cordillera, had never exercised any rights whatsoever over the valley.

The Chilian Expert, and after him the Chilian Government, accepted the boundary line over the *western* ridge of the Cordillera, and since that time the Argentine dominion over the Valle de los Patos has not been questioned ; but it is important to bear in mind the above-mentioned claims, as they throw light upon the Protocol of 1893. Had this Protocol not ordered that when the Cordillera is intersected by rivers the boundary line must cross those rivers, the Chilian Government *would never, after 1893, have disputed the Valle de los Patos trying to mark out the frontier along the eastern chain of the Cordillera*, since it is cut by the Los Patos river—a fact known for centuries in the two countries.

This section of the Chilian line bears the numbers 91 to 121, and forms a portion of the boundary that has been finally settled.

Section D: From $32^{\circ} 33'$ to 38° .—The proposed Chilian line is the same as that proposed by the Argentine Republic, and is the traditional boundary which agrees with the Chilian Constitution, the Treaties and the administrative laws, all of which have fixed it in the Cordillera, in the "*linea culminante de los Andes*," or the "*cumbre de la Cordillera*," that is to say, in the high crest of the main chain of the Andes, as has been described by the Argentine Expert. Nowhere in these, or in any other documents, is it said that the *continental divide* is to be the boundary line, and consequently the statement of the Chilian Expert that the line in this section has been traced according to the continental division of the waters is misleading, as it is simply a coincidence.

The Chilian landmarks bear numbers 122 to 222.

Section E: From Copahue Volcano 38° to Santa María Pass, $38^{\circ} 52'$ S. lat.—The eastern chain originated by the bifurcation of the Cordillera—a bifurcation

which forms the upper valley of the Bio-Bio river—was considered in Chile as the main chain of the Cordillera de los Andes, as the Cordillera mentioned in the Chilean Constitution, and as the “*linea culminante de los Andes*” of the administrative laws, the Bio-Bio having been regarded as a Chilean river throughout its whole course. Among the various documents which establish this belief there is one of paramount importance, as it reveals what was the official interpretation of the Treaty of 1881. This document is the decree signed by the President of the Republic of Chile, October 8, 1888, referring to the Province of Bio-Bio and to the Sub-divisions and districts of the Laja department. It reads thus :—

“Sub-delegation 21, *Quilleco*.—Bounded : on the north and west by the southern and eastern limits of sub-delegations Nos. 8 and 18, excluding the Canteras circuit ; on the south the Duqueco river, from its rise to its western extremity, which forms on this side the Curiche property ; and on the east the *Cordillera de los Andes*, which is the boundary with the Argentine Republic.”

But, through what features did the line of the Cordillera pass, according to the opinion of the Chilean Government, expressed in 1888 ?

The Decree further states :—

“District Number 3, *Tinajon*.—Bounded : on the north by the line of the sub-delegation on this side, between its eastern extremity and the western confine of the Casa de Tabla property ; on the south the limit which on this side has the Casa de Tabla and Tinajon properties, separating it from Ñipan farm (hacienda) from the extreme south of the western circuit of the Casa de Tabla property to the Cordillera ; on the east the upper edge of the *Cordillera de los Andes* ; and on the west the circuit which on this side encloses Casa de Tabla.” *

When Chile occupied the Bio-Bio valley as far as the eastern chain, she believed that in the crest of the latter was the *upper edge* which she conceived as frontier. In that valley, Chilean forts were erected to defend the territory against the incursions of the southern Indian tribes at the time of the Treaty of 1881, and never has Chile crossed over the said ridge to the eastern side, but has maintained her jurisdiction and dominion over its western slope exclusively.

The Chilean Expert likewise traced his line over that chain, and argued that as this was the *dividing line of the continental waters*, the concession made by the

* Aníbal Echeverría y Reyes, *Geografía política de Chile*, etc., vol. 2, Appendix, pp. xxiv. and xxv.

Argentine Expert was a proof that the *continental divide* was the principle acknowledged in the Treaties. Such an argument is not consistent with facts, for the proceedings of the Argentine Expert were clearly explained, and only prove his desire for an amicable arrangement, and his good faith in maintaining as a perpetual territorial division, the one that tradition had already constituted between the Argentine Republic and Chile.*

Had the Argentine Expert acted as the Chilean Expert did, he could without departing from the letter of the Protocol of 1893, have proposed the cutting of the river Bio-Bio which intersects the *main chain* of the Cordillera. But the Argentine Government, and it might be said, the Argentine nation in this boundary question, have had but one single and unalterable desire, and that is to establish between both countries the traditional boundary—the natural frontier that has always divided the two nations, without the possibility of *encroachments* from either side. These lofty aims have guided the Argentine Expert when placing the boundary line in the *eastern chain* of the bifurcation, *and he has altogether disregarded the continental divide*, although the line in this section may coincide with it.

Moreover, when making this concession, the Argentine Expert, in order to prevent any misconception, plainly declared that it was not to be taken as a precedent.

The Chilean line, which is the same as the Argentine line, is marked with the numbers 223 to 233.

Section F: From the southern end of the Santa María Pass (lat. 38° 52') to Mount Paimum (lat. 40° 5') where the Chilean proposed line commences to encroach on Argentine Territory in the south, as it had already in the north.—The line follows the main chain of the Cordillera, and is in agreement with the boundary line fixed by the Constitutions, Treaties and administrative laws, which restrict the Chilean territory to the western slope of the Cordillera de los Andes. This line, which coincides with the Argentine line, is also in agreement with the traditional boundary between the two nations.

The Chilean landmarks bear the numbers 234 to 253.

Section G: From the commencement of the Chilean encroachment upon Argentine

* The Chilean Representative, in his Statement read at the meeting of May 8, has quoted from the Record of September 3, 1898 only some words of Dr. Moreno, when giving his reasons for accepting the Chilean Expert's line in the eastern branch of the Cordillera. The complete quotation is given in this Report on p. 417.

Territory at Mount Perihueico to Perez Rosales Pass, which according to both Experts is in the main chain of the Andes, $40^{\circ} 5'$ to $41^{\circ} 10'$ S. lat.—This part of the line disregards—

1. The traditional boundary between the two nations.
2. The limits of Chile fixed by the Chilean Constitutions and Treaties.
3. The limits of Andean provinces, fixed by Chilean Laws in the “*cumbre de los Andes*.”

4. The Treaty of 1881.

5. The Protocol of 1893, which was framed (according to its preamble) with the purpose of “*removing the difficulties which have embarrassed or might embarrass the Experts in the fulfilment of their mission.*” (The difficulties previously met with were those which are renewed by the Chilean Expert in this and in other sections of the line.)

6. The facts connected with, and leading up to the Protocol of 1893, which were known to the Chilean Expert, as he was aware of the proposal of the Minister for Foreign Affairs for Chile for cutting the Palena and the other rivers intersecting the boundary line of the high summit of the Cordillera.

7. The uninterrupted possession of those lands and waters by the Argentine Republic, which owned them all, as successor of the King of Spain, and as acknowledged by the Treaties of 1826, 1856, 1881 and 1893.

The points and direction followed by the Chilean line are justified *by no evidence either in Argentine or in Chilean history, Constitutions, Treaties or Laws enacted for the administration of either nation.* Many of the points and the line which they mark are *outside the Cordillera*, and outside its *main chain*, being in the slope of the said Cordillera up to which culminating edge, according to Article 2 of the 1893 Protocol, the Argentine Republic retained her dominion and sovereignty.

Therefore, the landmarks proposed by the Chilean Expert do not correspond with the Argentine line, which is the same “*cumbre de los Andes*” or “*cumbre de la Cordillera*” that separates the Chilean provinces of Valdivia and Llanquihue from the Argentine Republic. Some of the said landmarks, being altogether outside the Cordillera, cannot be taken into consideration at all, as according to the Agreement of 1896, only those which are situated within the Cordillera were to be submitted to the Arbitration of Her Britannic Majesty's Government, should a difference arise between the Experts respecting their location.

The encroachment attempted by the Chilian Expert has never been actually made by Chile, for the simple reason that the Cordillera in this part is practically impassable during six months of the year, being indeed difficult to cross during the remaining months; and so Chile has been confined to the western side of the Andes. It was this consideration that prompted the Spanish Sovereigns to separate the Kingdom of Chile from the Virreinato del Rio de la Plata by the "Cordillera Nevada."

The abnormal fact of Lake Lacar flowing through the Huahum river into the affluents of the Pacific *was very generally known in both Republics before and after 1881, and specially to the Chilian authorities of the Valdivia province, to which that part of the western slope belongs.*

The Argentine army had built there a military fort, and the Argentine Civil Authorities had established Police posts and guarded the Passes in the Cordillera with Customs posts, *where goods coming from Chile incurred duties, which were paid without demur*, since the eastern slope of the Andes was considered there and everywhere else as Argentine territory. In the lands round Lake Lacar, besides the military camp, there are numerous settlements; and more than one Chilian citizen has rented portions of those lands from the Argentine Government, and pays the imposts and taxes ordered by the Argentine Congress for the whole country. Never has a Chilian authority existed in that region, and never have the Chilian citizens established there made any claim or complaint against Argentine laws.

A glance over the maps graphically indicating the two lines will suffice to show at once that some sections of the proposed Chilian line *are not situated in the Cordillera de los Andes as ordered by the Treaties and in the form by them established*, notwithstanding what was asserted by the Chilian Minister for Foreign Affairs in the Record of September 22, 1898, based upon the Statement of the Chilian Expert.

The Chilian landmarks are indicated by Nos. 256 to 263. Nos. 264 to 270 correspond to a part of the line which coincides with the one proposed by the Argentine Expert.

Section H: From Perez Rosales Pass, where the greater encroachment of the Chilian line on Argentine Territory commences, to Mount Fitz Roy or Chalten, where both lines meet again. From 41° 10' to 49° 10' S. lat.—Here occurs the full development of the plan indicated in Mount San Francisco, and revealed in Lake Lacar, which is exhibited in such a magnitude in this section, that though

it only comprises eight degrees of latitude, the line proposed has with its zigzags an extent of more than 1000 miles.

It was specially in reference to this section that the Protocol of 1893 was framed, with the intention of solving the difficulties encountered by the Experts, as well as those that might afterwards arise ; it was specially in reference to it that the Argentine Expert, in fulfilment of his duties, endeavoured to obtain from his colleague the declaration persistently resisted but finally stated in the Record of September 22, 1898, that the boundary marks proposed by him in the so-called continental divide were situated in the Cordillera de los Andes as ordered by the Treaties, and in the form which they establish. This declaration of the Chilean Government was the last official interpretation of the Treaties, and it became unavoidable owing to the encroachments made by the line proposed by the Chilean Expert.

The Chilean projected boundary, notwithstanding the assertion in the Record of August 29, is somewhat indefinite, and whilst the Treaty of 1881 orders that a direction from north to south is to be followed, and whilst the Cordillera keeps the said direction, the line twists and winds in capricious zigzags. Departing near Perez Rosales Pass, *eastward*, it continues the same general trend, though irregularly, for a distance of more than thirty miles ; it then turns to the south, still as an irregular curve, and afterwards to the west, which direction it follows for many miles ; then approaches the Cordillera, and, without reaching it, turns again *to the east*, then to the south and again to the east, continuing in that direction until it reaches a point where it is over sixty miles outside the Cordillera, in the plains of Patagonia. Thence, with a zigzag, it turns *again to the west*, and reaches Mount Fitz Roy in the Cordillera to which it ascends, solely because Lake Viedma and Lake Argentino interrupt the continuity of the continental divide in the plains.

The Chilean line, or more correctly *the Chilean Expert's line*, encroaches upon Argentine settlements which were never possessed by Chile, nor even claimed by her ; but which now, regardless of the Treaties, and of successive declarations made by the two Governments, she is endeavouring to incorporate to her territory, though there are thousands of inhabitants who are developing industries, commerce and education, protected by Argentine laws, which for many years has ruled in those lands, and is the common law of the country.

On one occasion a Chilean office authorised the working of some mines in the neighbourhood of the valley 16 de Octubre, but this grant, which was never

acknowledged in official documents, *has been entirely ignored by the Chilean Government*, notwithstanding the claims of the Concessionnaire to be put in possession of the mines. These claims are now ten years old. When the Chilean Minister at Buenos Aires protested in 1898 against the Argentine settlement of the eastern slope of the Cordillera, he did not mention this concession to the west of the continental divide.

The landmarks proposed by the Chilean Expert in this section are all against the provisions of the Treaties. The Argentine Expert therefore affirms—

1. That the Chilean line is either wholly outside the Cordillera de los Andes or outside its main chain.

2. That a proof of this is that it runs from *east to west* and from *west to east*, disregarding the fact that the Treaties stipulated a boundary from north to south in the Cordillera, because the main chain of the Andes keeps always that general direction.

3. That this line carries the boundary far in the plains of Patagonia, so much so that it *extends at times for more than a hundred miles in regions where not a single important hill is to be found*, many of the landmarks being placed in “swamps,” “low lands,” “bends of rivers,” and at the “base of the table-land,” instead of being planted at the passes and accessible points of the mountains, as stipulated in the Protocol of 1893.

4. That this Chilean line is accessible from the east or Argentine side all the year round, over every inch of its length of more than 1000 miles—a fact sufficient to prove that the said line is not in the Cordillera, inasmuch as during almost the whole year, that part of the Cordillera is not accessible, and only with great difficulty very few travellers can reach its summit from the west during short seasons, as has been ascertained by Chilean geographers.

5. That a further evidence that the landmarks are not situated in the Cordillera, is afforded by the description made by the Chilean Expert himself of the places where the said marks are proposed to be planted. In no case, is it stated that the landmarks objected to by the Argentine Expert are placed in the accessible passes of the Cordillera de los Andes or on the accessible mountains, as the Treaties stipulate.

6. That the so-called “uninterrupted summits” dividing the continental waters as interpretation of the words “main chain,” cannot be founded upon the nature of the ground, as such summits do not exist therein; that the name

“Cordillera,” given to some hills almost always isolated, is a misnomer, as these hills are all entirely outside the “Cordillera de los Andes.”

7. And finally, that there is not to be found one single geographer or explorer, who has stated that, amongst others, the sources of the river Palena, the swamps of the river Pico, the shores of Lake Buenos Aires, or Lake San Martin, are situated within the Cordillera de los Andes, although in all of these places the Chilean landmarks are located.

Section I: From Mount Fitz Roy or Chalten to Mount Stokes, $49^{\circ} 10'$ to $50^{\circ} 49'$ S. lat.—The line which reaches Mount Chalten or Fitz Roy, from the east in a *W.N.W. direction*, runs from this point to Mount Stokes, over the Cordillera de los Andes, and fulfils all the conditions that the Treaties stipulate, according to the interpretation given by both Governments, and by the Argentine Expert, as previously expressed. This section coincides, therefore, with the Argentine line, *and forms one of the settled parts of the boundary between the Argentine Republic and the Republic of Chile.*

The directness and regularity of this portion of the Chilean line, as seen on the Chilean map itself, forms a striking contrast to some of the other sections, which present a most remarkable and fantastic appearance.

Section J: From Mount Stokes in $50^{\circ} 49'$ to 52° S. lat.—The line, as soon as it leaves Mount Stokes, instead of following the north and south direction of the Cordillera de los Andes, runs winding *eastward* from the western side of the meridian of 73° W. long. from Greenwich to the eastern side of the meridian of 72° , thence to the parallel of 51° S. lat., and afterwards, following a strangely irregular course, it reaches 52° S. lat.

This line encroaches throughout the whole of its length upon settled Argentine territory, and possesses the same defects, and is open to the same objections as Sections A, E and H. It is outside the Cordillera, in the low lands, and is traced regardless of the Treaties, and, as well as the other sections before named, regardless of the very important considerations, political, economical and administrative, which marked the summit of the Cordillera as the mutual boundary.

4. THE PROPOSED ARGENTINE LINE FROM A POLITICAL, ECONOMICAL AND ADMINISTRATIVE POINT OF VIEW.

As it has been shown, the Argentine line throughout its entire length, runs over the Cordillera de los Andes, leaving to Chile the whole of the western slope, with its waters, lands, settlements, and everything she has possessed from the first day of her independence, and over which she has the sole right to exercise full authority and administration. Among the sovereign rights left to Chile as co-proprietor of the Cordillera de los Andes are included those of opposing or allowing any railways proposed to be made across it, and of easily guarding its passes, gaps and the cuttings that may be made for the purpose of intercommunication. She would be enabled to provide ample security for the inhabitants, throughout the whole country, since the offenders against persons or property could not depend upon the facility of abandoning the territory to evade the pursuit of justice, and therefore she would be enabled to enforce her laws as completely as a civilised nation can, with a territory enclosed by good and easily guarded frontiers.

The Argentine line should not therefore be objected to by Chile, for it does not encroach upon anything belonging to her, nor upon anything which might be necessary for the natural development of her industries, commerce and administration, or for the security of the State. Every Chilean settlement prior to the Treaty of 1881,* has been reserved to her in accordance with the Protocol of 1893, which secured to Chile as a guarantee of all the rights, powers and resources above enumerated, the dominion and sovereignty over the whole territory extending to the west of the main chain of the Cordillera de los Andes which she held up to that moment.

The Chilean nation has not been menaced with the deprivation of her lines of defence in the Cordillera through the application of the Treaties by the Argentine Experts; and relying upon this security she exclusively strove in the Protocol of 1893 to solve the question of the channels in the south, as, in compliance with the Treaty of 1881, some of these were to belong to the Argentine Republic, and in Chile the opinion had been publicly expressed that this result would be a danger lest it might in the future bring Argentine influence to bear on the Pacific questions.

The Argentine Republic never held any military interest on the Pacific coast, as is shown by her agreeing to cede the region in the neighbourhood of the Magellan Straits to Chile, provided that the Straits should remain neutral and open to vessels of all nations. Moreover, the Argentine natural defence had nothing to seek in the channels of the Pacific ; it was in the Cordillera de los Andes that the nation could never agree to abandon a single inch of her eastern slope. It was in pursuance of this view that Article 2 of the Protocol of 1893 stated that the Argentine Republic "*conserva*," that is to say, *reserves and retains* the dominion and sovereignty over the whole territory to the east of the main chain of the Andes. The Protocol of 1893 was thus framed, as has been said, in the form of an expression of the compromise which the two nations accepted.

The Argentine line, as laid down, is a permanent boundary : it respected the main chain of the Cordillera as the dividing line ; and it can be said with perfect truth that that chain is in itself an assurance of peace between the two nations, and that this barrier prevents any encroachments, the *Cordillera Nevada* being placed by Nature as a safeguard to the destinies of both. While Chile develops her progress on the Pacific side, Argentina plays her corresponding part on that of the Atlantic.

The proposed Argentine line is, therefore, an adequate boundary, and it preserves the western slope of the Cordillera to Chile as well as the shores of the channels that penetrate into the Pacific Ocean.

These satisfactory results that would ensue to Chile from the Argentine Expert's line form a striking contrast with those that would ensue to the Argentine Republic if the Chilean Expert's line were to be applied. This will be apparent to the Tribunal when taking into consideration the reasons that have guided the Argentine Expert in proposing his line and in refusing that of his colleague in those parts previously referred to where differences have arisen.

It has been clearly shown :—

1. That the importance of the issues at stake could not be greater.
2. That the Cordillera de los Andes, on its colossal granite base, forms an insurmountable barrier.
3. That the main chain of the Andes is a single one according to Nature and to science.
4. That the main chain of the Andes is the traditional boundary between the Argentine Republic and Chile, and is the boundary stipulated for in the Treaty

of 1881, and more fully explained in the Protocol of 1893 and in the Agreement of 1896.

Over that *single* principal chain of the Andes the Argentine Expert has truthfully traced his line, which is fully supported by historical evidence, documents, scientific opinions, and by the maps and photographs that are submitted to the Tribunal.

The "Cordillera de los Andes," as it is styled in the Treaty of 1881, the "principal chain of the Andes," as it is called in the explanatory Protocol of 1893, and the "Cordillera Nevada," as the *traditional division* between the "Virreinato del Rio de la Plata" and the "Capitanía General de Chile" was named, possesses characteristic features which must be found in the boundary line between the two nations which had inherited the rights once held by Spain over that part of South America.

These characteristic features may be thus enumerated :—

1. The "Cordillera de los Andes" in its principal chain is continuous, with perpetual, or almost perpetual snow on its summits, crests and passes, during the whole winter, forming a snowy line between the two nations.

2. As a continuous snow-covered range, the Cordillera along the "principal chain" is practically *impassable* during the winter season.

3. The Cordillera Nevada being thus impassable, forms a real division between the Argentine Republic and Chile during the greater portion of the year.

4. The principal snowy range, as a continuous chain, and as a boundary, effectually breaks the connection between the territories of the respective countries.

5. During the snowy months, along the whole extent of the boundary line between $26^{\circ} 52' 45''$ and 52° S. lat.—a distance of nearly 2000 miles—there is not a *single pass* across the Cordillera de los Andes, through which regular communication could be established between the Argentine Republic and Chile.

6. The water-gaps existing in the "Cordillera Nevada" do not break its continuity, as they always form torrents, where navigation is completely impossible.

7. The Andean wall necessarily precludes conflicts of jurisdiction, and thus during the period which has elapsed since the declaration of independence

of the two nations, there have never been in the frontier any difficulties between their military forces, administrative employees or private citizens.

8. The snowy chain facilitates the control over the countries which it divides. The two nations, in fact, have never had any hindrance as to means of government and communication within their own territories, and it has never been found necessary to pass over regions belonging to one of them in order to administer or intercommunicate any portion of the other.

All these enumerated features are the undeniable facts of Nature, as such can be easily verified, and, indeed, are well known to both Governments interested in the boundary delimitation. The Chilian Representative would find it difficult to rebut these facts *constituting the characteristic features of the principal chain of the Andes*, and which must necessarily be found in the boundary line to be marked out.

The proposed Argentine line has, as already stated, *all the characteristic features that the boundary is to possess*. It runs along a continuous chain in the region of perpetual, or almost perpetual snow, its summits and passes being covered with ice and snow at least during the whole winter. It is the same "Cordillera Nevada," that has *completely separated Chile from the Argentine Republic*, rendering all communication between the two countries extremely difficult during the greater portion of every year. It is an uninterrupted boundary line, making no breaks of continuity in territories possessed by Chile since the date of her independence. When it crosses water-gaps of the chain, it passes by narrows, over rapids or cascades which render their navigation impossible.

In a word, the Argentine Expert affirms that his proposed line is situated in the principal chain of the Andes, with the two exceptions already explained—those of Bio-Bio upper valley and the Calen Inlet—these exceptions being specially made so as not to interrupt the jurisdiction of Chile, and not to encroach upon her possessions, according to the Treaties. Besides, this line has not been considered by the Chilian Government to be outside the highest summits of the Cordillera de los Andes.

The Argentine line is the line of the Treaties : it runs along "the most elevated crests of the Cordillera de los Andes," of the 1881 Treaty, along "the principal chain of the Andes," of the Protocol of 1893, intersecting the rivers where they cut across the main chain, following from north to south the "Cordillera Nevada" of the traditional boundary, and giving no access to Argentina to the Pacific shores.

Can the boundary line proposed by the Chilian Expert be subjected to the

same test which had already been applied to the Argentine line? Had the Chilian Expert recognised to the Argentine Republic the same rights, the same powers, and the same means to maintain her dominion and sovereignty, to the east of the main chain of the Cordillera de los Andes, the boundary question could have been settled many years ago.

5. THE PROPOSED CHILIAN LINE FROM A POLITICAL, ECONOMICAL AND ADMINISTRATIVE POINT OF VIEW.

The Argentine Republic, when agreeing with Chile for the delimitation of the two countries along the main chain of the Cordillera de los Andes stipulated—

1. That any questions that might arise, either on account of the Boundary Convention, or owing to any other cause, should be submitted to Arbitration, *but in all cases the Cordillera must constitute the immovable boundary between the two nations.*

2. *That the Argentine Republic reserved and retained, as belonging to her dominion and sovereignty, THE WHOLE TERRITORY including both land and water TO THE EAST OF THE SAID MAIN CHAIN OF THE ANDES.*

Chile on her part agreed to these stipulations, retaining her corresponding rights in the western side of the range. The proposed Argentine line had respected those rights. Is a parallel result obtained for the Argentine Republic by the proposed Chilian line? A rapid glance over Plate X. shows in a clear manner that, as regards the two stipulations referred to, inasmuch as they favour Argentina, both have been completely disregarded and set aside. The boundary declared to be immovable in the Cordillera is projected outside of it, over the Argentine plains. A region to the east of the main chain of the Andes, of a probable area of no less than 25,000 square miles, is taken from the dominion and sovereignty of the Argentine Republic, and is transferred to Chile, as well as more than half the extent of both slopes of the Cordillera de los Andes from about parallel 40° to 52° S. lat. This fact would be enough to cause the proposed Chilian line to be rejected, as it is not, and never could be the line agreed upon.

The whole frontier in regard to which the Arbitration was possible in case of divergences of opinion between the two Experts when placing the

landmarks in the Cordillera, extends from $26^{\circ} 52' 45''$ to 52° S. lat.,—that is, more than twenty-five degrees of latitude.

Throughout this long extent runs, uninterruptedly, the Cordillera de los Andes which was before 1881, as it is now, and as it ever must remain, the mutual limit between the Argentine Republic and the Republic of Chile. The boundary along the summit of this Cordillera is of great value for the administration of the country, as well as for its defence, inasmuch as, notwithstanding its great length, there are but very few passes that would permit of the easy crossing of the range during the whole twelve months of the year.

This fact clearly shows that if Chile possessed also the eastern slope of the Cordillera she would have exclusive power to open or close the said passes, and to permit railways to cross either over the range or by tunnels, whilst if that slope remains Argentine, as it must remain, both countries would exercise as co-proprietors similar powers, thus permitting the enforcement of the commercial and political laws without contravening the rights or laws of her neighbour. These considerations, together with other reasons no less important, caused the Argentine Republic to stipulate the two clauses already mentioned when the Boundary Treaties were agreed upon.

However, all these rights and facilities, and the natural security afforded by the Cordillera, and possessed by the Argentine Republic since the days of her independence, are set aside by the Chilian Expert, in disregard of binding Agreements and of the important interests at stake; and in addition, it is even stated that such results are the natural outcome of Argentine stipulations. In fact, it has been claimed that the Chilian line was planned according to the Treaties and Agreements made by the Argentine Republic, and it has been suggested that in order to change such a line, and thereby arrive at the proposed Argentine line, it would be necessary to frame new Treaties. This is equivalent to maintaining that every man in the Argentine Congress and Government would have forgotten his country's rights and interests.

The Chilian line with its preposterous encroachments, south of 40° S. lat., takes no less than 550 miles out of the *Cordillera line*, which measures 850 miles, and, running to the eastern slope and to the plains, forms a winding line of more than 1050 miles in a frontier which is an open door offering an easy access during the twelve months of the year over every inch of that distance.

The serious results of such a line for the Argentine Republic would be incalculable, as Chile, once owner of the eastern slope of the Cordillera, could

encroach by economical laws, upon the Argentine jurisdiction. Had such a line been agreed to, it would render impossible any effective vigilance and any administration of justice, without reckoning with the enormous cost of guarding such a frontier of more than 1050 miles, accessible on all sides, and of keeping contraband practices in check. How could Chile, even with the best of intentions, prevent such practices owing to the extreme difficulty of access all the year round from the Pacific side?

The Argentine national defence, as important as that of any other country, would likewise be fundamentally affected to the exclusive benefit of the Chilean nation. Chile is a growing country with no great extension to the south, and with no active industries in that part of her territory, owing to its physical conditions. The Argentine Republic is also a growing country, whose foreign population is increasing in a larger proportion than is the case with Chile, and she has a great extent of territory with active industries all over its surface, and in the southern pampas cattle farms peopled by natives and foreigners. The population settled in those regions needs and demands a good frontier as a guarantee for life and property; cattle farming, as well as any other industry, requires security for its development.

The situation of the two countries explains two facts:—

1. The Cordillera de los Andes is the frontier necessary to the Argentine Republic, because with this barrier standing between the two nations no encroachment or friction is possible.

2. Only the full dominion and sovereignty over the whole *eastern slope of the Cordillera* can provide the Argentine Republic with the elements required for her national defence.

These high political reasons caused the resistance to the Chilean Expert's pretension to take a part of the territory to the east of the *main chain of the Cordillera*, which if carried out would break up those elements of national defence and national security, which the Argentine Government had never alienated and could never alienate.

The Chilean line would then be, were its realisation possible, a dangerous boundary, encroaching upon Argentine economical development and entirely suppressing the natural elements of her national defence. The possibility of such an eventuality is what the Argentine Government, taking a firm stand upon all their rights as co-proprietor in the main chain of the Andes, has always decidedly resisted.

The Chilian line is, as has been shown, altogether outside the Treaties, and is moreover an impossible boundary. Never for a moment have considerations concerning the possession of peaks or abysses dictated the action of the Argentine Republic. What the Argentine Republic has sought, is a frontier which would for ever assure peace to the vast industries which are being developed throughout her entire territory, and which would irrevocably define the respective spheres of activity of two kindred peoples.

Out of the enumerated characteristic features of the "main chain" of the Andes, viewed as a natural and political boundary, the line proposed by the Chilian Expert possesses all those features *in that portion which coincides with the Argentine line, and is destitute of all of them at the points where such coincidence does not exist.* And this is obvious, for if the proposed Argentine boundary is in the main chain of the Cordillera de los Andes, surely the Chilian line that does not coincide with it, *is out of that chain.*

The whole boundary line from 26° 52' 45" to 52° S. lat., in the Cordillera has a length of about 2050 miles, and it may be said, that out of the total length, the boundary already settled has a length of about 1350 miles, accepted by the two Experts and ratified by the two Governments. Now the remaining 700 miles have been converted in the Chilian line into about 1050 miles which have not in their favour *a single one of the characteristic features of the "principal chain of the Andes."*

The proposed Chilian line is not situated in the continuous chain, which has perpetual or almost perpetual snow during the whole winter season. Differing from the main chain of the Andes, which is impassable at least during the snowy and the rainy seasons, this line is accessible during the whole year over every inch of its 1050 miles, where there is no difficulty in crossing from one side of the line to the other. It is also a level line outside of the mountains; and is not, therefore, the impassable and traditional "Cordillera Nevada." *At no period did it form a permanent, well-defined and natural separating line between the two nations.* It is, lastly, a boundary line which would leave to Chile in the eastern side of the Cordillera a territory with several interruptions of continuity, and which produces a serious result in the political geography of both nations.

More might be said on the impracticability of the Chilian Expert's line. To the east of the Cordillera, enclosed by the Chilian line in the region near Lake Lacar, between Ipela and Quilquihue, there lies a small portion of territory, whose settlers could never live exclusively upon its products. It is

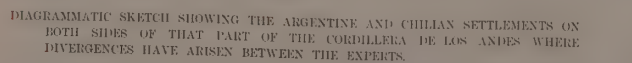
not possible to establish communication, at least during six months of the year, between this zone and the Chilian territory on the western side of the Cordillera : the Indians themselves, who dwelt there, communicated through the east and never through the west. If that region were declared under Chilian dominion, would not such a state of things be a political and geographical error? Would not such a boundary, were it a possible one, endanger the international relations of the two countries?

The same thing would occur in the southern region of Nahuel Huapi. The access from the western side to the summits of the Cordillera is so difficult, *that to this day not a single man* has yet reached the plains in this century coming from that side. If it were intended to open up routes and passes for purposes of commerce even for a short period of the year, they certainly could not last, because the first avalanches or floods would destroy them. But supposing such routes and passes to be available in the fair season, the settlements there established *would be shut out from communication and commerce at least during six months of the year*. On the contrary, the *eastern* side is quite open all the year round to these valleys situated to the east of the summit, and besides, they are already peopled by Argentine cattle-farmers, having resources of every kind at hand. Plate XIII. will show the distribution of the Argentine and Chilian settlements up to 1898 in the two sides of the Cordillera.

The plain between Lakes Gutierrez and Mascardi is accessible at every time, in every season, and communication through it to the eastern slope of the Cordillera is very easy between Nahuel Huapi and Valle Nuevo, by a level road. Is it possible to accept a boundary, which, converting those lands into Chilian territory, would place them in a position so contrary to nature and political science, thus becoming a source of permanent protest and of incalculable difficulties? If the settlers in this region claimed by Chile cannot have, during at least six months of the year, any intercourse with Chile on the western slope of 'the Cordillera,' would this not form a break in the continuity of the Chilian territory? Would it not be a cause of possible disturbances on this frontier, the access to which from the east, i. e. from Argentine territory, is quite easy during the whole year?

The same thing occurs in other sections of the proposed Chilian line.

The rivers Manso and Puelo are not navigable : rapids, torrents and narrow parts make it altogether impossible to convert them into fluvial routes coming from the west; and it may be affirmed that should a road be made with



DIAGRAMMATIC SKETCH SHOWING THE ARGENTINE AND CHILIAN SETTLEMENTS ON BOTH SIDES OF THAT PART OF THE CORDILLERA DE LOS ANDES WHERE DIVERGENCES HAVE ARISEN BETWEEN THE EXPERTS.

difficulty and at great expense, it would not last, as it would be destroyed by the first flood and by landslides and other accidents.

Moreover, how would it be possible for Chile to carry on traffic and commerce through the passes in the principal chain of the Andes, from the eastern slope where the sources of the river Bodudahue and of the river Riñihue are to be found? There exist very serious hindrances, as the river—being a torrent—is unnavigable, and the landslips caused by the abruptness of the hills are obstacles which in the very months (two during the year) of the favourable season, would interfere with regular traffic ; and as to the rest of the year, those passes are altogether impracticable.

It is said that communication could be established through the rivers Puelo, Fetaleufu, Palena, Cisnes, Aisen and Las Heras amongst others. The preceding photographs of some points in those places will answer that assertion. The rivers Puelo and Fetaleufu cut through the compact mass of the Cordillera by a series of narrow defiles, forming cascades and rapids; the Palena is navigable only in its lower course, having also big rapids and narrow canyons in its two principal branches ; the Cisnes is so difficult to ascend, that Dr. Steffen, in 1898, spent four months of hardships to arrive at its source ; the Aysen has also big rapids, as is the case with the river Las Heras, which is crossed by the Argentine line through a large waterfall. It is also impossible generally to utilise the banks of those rivers, where they exist, as the floods produced by the frequent rains on those regions are so sudden that the waters rise sometimes tens of feet, even in a few hours. To have a road, or a mere path there, would be very costly, as, on account of its being located in such abrupt torrential parts during the rains and melting of the snow, it would be of very short duration and almost impossible to keep up.

On the other hand, all those lands and territories from Nahuel-Huapi to Fetaleufu, east from the summit of the main chain, including the valleys to the west of Lake Gutierrez, the longitudinal eastern valley, from Lake Mascardi to Lake Puelo, called "Valle Nuevo," the valleys Cholila, "16 de Octubre," etc., are at present logically and naturally dependent upon the Argentine Republic, and will always be so, for it would be utterly impossible to close in the Patagonian plains with a wall to the east, and to break down or open the colossal barrier which they have to the west. Nature will always compel the settlers in those regions to carry on their intercourse through the Argentine territory, and even if it were possible that Chilean settlements could be established

there under protection of the Chilian flag, they would also be entirely dependent upon the Argentine Republic. At this moment nearly 5000 people have settled on the eastern slope of the Cordillera, and not one of them has passed across the Andes south of Perez Rosales Pass.

The same is to be said of the lands in the valley of the Carren-Leufu, or Upper Palena. In this region not even on the western slope of the Cordillera, can Chilian settlements thrive, and there exists an eloquent fact to prove it. The Chilian Government established a colony on the coast of the Pacific Ocean, at the mouth of the Rio Palena. The present Argentine Expert visited it ten years after its establishment, *and found there, as the whole population, six adults.*

This happened at the mouth of the river Palena, on the shores of the Pacific, where communication is easy during the twelve months of the year. What, then, may be expected if men and merchandise should have to cross the gorges and rapids of this same river Palena, which cuts the mountains from the east to the west of the *Cordillera Nevada*? Is there any one who can reasonably maintain that the population there would endeavour to keep up trade or intercourse during two or three months of the year across those snows, almost perpetual rains, rapids and torrents, and that they would prefer such a route to the open, cheap and easy one which during every month offers itself to them eastwards, towards the Argentine plains, and down to the Atlantic, in a level country, without snows, without continuous rains, without rapids, without torrents and without any danger?

The valleys of the Carren-Leufu are settled by Argentine colonists, and until to-day, no one has sought to open communication with the Palena colony, on the shores of the Pacific. Every one knows that the projected Argentine railway from the Atlantic side will become the best route for commercial intercourse. Nature has decided that those lands are to be dependent upon the east; they have been so to this day. The Argentine Republic has exclusive dominion and sovereignty over them.

Similar considerations, from a geographico-political point of view, must be made respecting that part of the basins of the rivers Pico and Frias or Cisnes lying to the east of the summit of the Cordillera, to show how useless are the encroachments of the proposed Chilian line upon this territory in actual Argentine possession. These lands are almost valueless in the hands of Chile, unless as a means of endangering the safety of the Argentine Republic, since such a scheme would deprive her of her strong and natural military defence in the "*Cordillera Nevada*," which Chile claims for herself in a vast extent.

Besides this possible strategical point of view, those lands, as is the case

with many others, are, must be repeated, valueless and useless to Chile, as they cannot have easy communication with the actual territory of Chile, viz. that of the western slope of the Andes ; but on the other hand, they are useful and valuable lands for the Argentine Republic, as they are simply an uninterrupted continuation of her dominions, and a portion of the eastern slope of the Cordillera, all of them being at all times within easy reach of the Argentine centres of commerce and activity. Manufactories, railways, roads, ports—every Argentine channel of life and progress can easily reach them, or can be reached by them, whilst they are entirely cut off from all the Chilean channels of life and progress, for Nature has interposed between them the snowy range. It is important to remember that the climatic conditions of that part of the western slope of the Andes south of 42° and the Island of Chiloé render extremely difficult the advance of human activity.

The basin of the river Pico has not yet been completely investigated by explorers over its whole extent, on account of natural obstacles where it cuts through the main range, and the basin of the river Cisnes offers so great and so many hindrances, that no permanent road to the west is practically possible. Reference has already been made to the fact that Dr. Steffen employed four months in crossing the Cordillera, from the Pacific side to the sources of the river in the undulating plains.

The very contrary happens on the east ; Argentine settlements have been established there for many years past, and the cattle-grazing industry is to be found in those two basins and in the valley of the river Carren-leufú. Those Argentine lands are crossed by waggon-roads, leading in every direction, and all that vast expanse is accessible from the east up to the very "Cordillera Nevada," and consequently across the *continental divide*, which occurs in the eastern slope of the Cordillera, and, in many places, outside of it.

The same is to be said of the region of the Upper Rio Aysen. This region is already so completely Argentine, that at the present moment a light railway is projected to connect it with Tilly road on the Atlantic coast, which will assist greatly in the opening up of those lands, and tend to their prosperity. The railway is to go to the eastern slope of the Cordillera, and it will impair neither the security of Chile, nor her rights, her riches, her dominion and sovereignty, and will increase the welfare and prosperity of the settlers in these regions.

Passing further south, let it be asked for the sake of illustration, Would it be possible for a supposed Chilean settlement to the east of Lake Buenos Aires,

to have communication with the Pacific during the whole twelve months of the year? What would be the advantage conferred upon the settlers near Lake Pueyrredon, if they had to communicate, at the risk of innumerable difficulties of all kinds, with the Chilian Calen Inlet, since they have before them an all-sufficient road to the east—easy, natural, and open all the year round? What would be the extent of land that the Chilian line (doing violence to Nature and to the Treaties) would give to Chile eastward of Lake Belgrano and between the latter and the *continental dividing line*? Five square miles, or thereabouts. How would it be possible to establish a permanent settlement there, or in the parts claimed near Lakes Azara and Nansen?

And the same would be the case with the zone of the affluents of the river Mayer, with the small tracts between Laguna Tar and Lake San Martin which probably do not exceed ten square miles, all of them being naturally dependent upon the east, which is open to them, as those tracts of land all form a portion of the eastern slope of the Cordillera, which gently spreads towards the Atlantic, affording easy communication everywhere. The torrent which forms the outlet of Lake San Martin is practically impassable, and never will there be a pass across the Cordillera to the shores of the east.

Nor would the small tracts of land situated in the neighbourhood of Last Hope Inlet be deprived of those attractive facilities of easy passage to the east; for although, through the inlet, communication by water could be effected by small vessels, it would never admit of comparison with that which now exists by the valleys Coile and Gallegos, the waggon-roads leading to many established cattle-farms, and with the other advantages which the development of the southern territory of the Argentine Republic and the projected light railway, will secure to settlers.

Plate XIV. gives an idea of the natural roads to the south of 38° S. lat., and of the advantages of the Atlantic way.

It suffices to glance at the map of those regions to make it evident that the rights of the Argentine Republic to all the lands and waters situated to the east of the Cordillera, of the principal chain of the Andes, must be respected, as Nature herself has placed for ever *under the eastern dependence*, the territories improperly claimed by the Chilian Expert, by means of his proposed line.



6. CAUSES WHICH LED TO THE DIFFERENCES BETWEEN BOTH LINES.

The many and important differences of opinion between the Experts when giving practical effect to the Treaty of 1881, to the Protocol of 1893, and to the Agreement of 1896, are mainly derived from the mode of procedure followed by each of them in laying down his proposed line. Though those differences have already been explained in a general manner, it is convenient, before entering into the detailed analysis of both lines, to consider some of the causes and reasons that have led the two Experts to the conclusions at which they have arrived, viz. the Argentine Expert to maintain as the boundary the summit of the Cordillera de los Andes, as ordered by the Treaties, and the Chilian Expert, departing from the said Treaties, to contend that the natural boundary is the vague continental divide, whether it coincides or not with the summit of the Cordillera.

It may be said that the most important amongst those causes and reasons, was the persistent tendency of the Chilian Expert to set aside the geographical features. He began by establishing a theoretical conception of the boundary, and afterwards he tried to mould the Treaties to it, by suppressing some of their clauses and by altering others. As he was not sure that his conception would be compatible with geography, he showed a very pronounced resistance to the surveying of the ground, and, when in compliance with the express orders of his Government, this survey was partially effected, he did not pay the slightest attention to the many and substantial contradictions to which his assistants were led when they sought to harmonize the natural features they observed with the abstract theory which he had imagined as the paramount principle in the boundary question. Being unable to base his opinions upon the actual facts, he has considered it proper to support them on manifest errors contained in maps prepared by persons unacquainted both with the Treaties and with the topography of the territory. As a consequence of these considerations, the maps drawn by the Chilian Boundary Commission are necessarily so arranged as to favour the doctrine of the continental divide, depicting orography and hydrography in the manner best fitted to said doctrine.

It is therefore essential to lay before the Tribunal the proof of all these

assertions, as it will help to make more apparent the advantages and suitability of the Argentine line in the points and stretches where the differences submitted to Her Britannic Majesty's Government have arisen.

The abandonment of the Cordillera de los Andes is the most remarkable characteristic of the Chilian Expert's line, being, besides, one of the principal causes of the divergences with his Argentine colleague.

It seems unnecessary to repeat that in the Cordillera de los Andes, and never outside of it, the boundary line must be sought, as it has already been thoroughly proved that the traditional limit between the Argentine Republic and Chile is the summit of that Cordillera along the watershed of its main chain. Since the days of Almagro, Chile has occupied the territory to the west of that summit. Without considering the exceptional jurisdiction over the province of Cuyo until the erection of the Virreinato del Rio de la Plata, to which that province was incorporated, no Chilian authority ever existed to the east of the high Andean crest, until the occupation of the Straits of Magellan in 1843. All historians, geographers and statesmen have placed the eastern frontier of Chile along the snowy summit.*

Were it necessary to adduce fresh considerations upon a point so well established in the preceding chapters it might be said that no one in Chile has stated more authoritatively this to be the boundary than her leading historian, Señor Diego Barros Arana, the Chilian Expert.† Amongst foreigners, few can speak in this case with greater authority than Sir Horace Rumbold,‡ then Her Britannic Majesty's Minister Resident, whose lengthened sojourn in the country qualifies him to say :—

“Any account, however superficial, of a country is appropriately preceded by some few remarks concerning its geographical position and physical configuration. In this respect Chile seems to call for special notice, the extreme length and *narrowness of territory* which give it so peculiar an aspect on the map, being in an unusual degree determining

* If the ignorance of some cartographers of the 18th Century has led them to consider as a part of Chile, or “Modern Chile,” a small portion of Patagonian territory to the east of the Cordillera, such a heading in a map is of no value whatever, especially as the Sovereign declared that the Capitanía General de Chile and the Virreinato del Rio de la Plata are separated by the Cordillera de los Andes, or “Sierra Nevada” of Almagro and Pedro de Valdivia.

† See pages 88, 411 and 412 of this Report.

‡ *Chile.* Report by Mr. Rumbold on the Progress and General Condition of Chile, dated Santiago de Chile, December 1875, in Reports by Her Majesty's Secretaries of Embassies and Legations, Commercial No. 14 (1876), part 3, London 1876, pp. 309 and 311.

causes, not only of its economical but also of its political conditions. *A strip of coast-land pent in between nearly the loftiest mountains and the broadest ocean of the globe*; its shores turned away from all the ancient homes of civilisation and facing the western sea, as yet mute and inglorious, though in no very remote period possibly destined to witness the contentions of new and powerful States; divided from the old world by the wide expanse of the Atlantic and the breadth of a continent, and till recently, approachable only by the deterring voyage round the stormy Horn, or a wearisome transit through the swamps and jungles of Panamá; it may well be said to have started on its way as a nation at a great disadvantage. . . . Chile claims to extend from 24° S. lat. to Cape Horn, with a coast line ranging over 2000 miles, the greater part of her territory, from the Province of Aconcagua south, being describable as one broad valley running due north and south, with narrower lateral and intersecting valleys, each rising step-like above the other *to the foot of the giant wall of the Andes.*"

Both these opinions are confirmed by one of the official periodical publications of Chile,* having an extensive circulation both at home and abroad. In the issue for 1882, i. e. after the signing of the Treaty of 1881, the following may be read :—

"The Republic of Chile occupies the south-western and most southerly extremity of America, through which it extends, being bounded on the west and south by the Pacific Ocean, from 23° S. lat. to the parallel which passes to the south of Cape Horn, including the island of Diego Ramirez, viz. 56° 35' S. lat. To the north its boundary with Bolivia is the said parallel of 23°. To the east it is separated from the Argentine Republic, in accordance with the Treaty ratified on October 22, 1881, *by the anticlinal line of the Cordillera de los Andes*, from latitude 23° to 52°, following on the east the boundary of the latter parallel as far as its intersection with the meridian 70° west of Greenwich; thence continuing to the south-east by the summit of Mount Aymond, the greatest heights of the hills of that part of the north coast of the Straits of Magellan and of Mount Dinero, until it terminates at Dungeness, or Miera Point, situated at the eastern entrance of those Straits, and from this point it follows southwards by the Cape of Espíritu Santo in 52° 40' S. lat., as far as the Beagle Channel, where it is cut by the meridian 68° 34' west of Greenwich, and afterwards it passes to the east of the said channel by the southern side of the Island of Los Estados.

"*Configuration and aspect.*—The form of the territory is that of a long band stretching at the foot of the Andes, between this Cordillera and the Pacific Ocean. The longitudinal line of its coast runs from north to south as far as 34° S. lat., whence it turns towards the west, and then again to the east, thus forming an angle of 8° with the meridian of Cape Horn.

"Its physiognomy presents some rather original features. Towards the east lie the Andes, *with their lofty summits* and numerous spurs, whilst on the west, the Cordillera de

* Sinopsis Estadística y Geográfica de Chile, 1882. Santiago de Chile, 1883, p. 3.

la Costa, or maritime cordillera, which may be said to run more or less along the shores of the Pacific, stretches parallel with them.

"Between these chains of mountains, the central valley unfolds itself as a broad flowing river between two high banks spreading without interruption from 33° to $41^{\circ} 30'$ S. lat., in which lie the chief centres of population, and where exist the best areas for cultivation."

The issue of 1892,* although it modifies the boundary in the northern part, states that it must be traced from $26^{\circ} 33'$ along the *divortium aquarum* of this Cordillera (de los Andes) as far as 52° S. lat.; and adds :—

P. 5.—"As regards the configuration of Chile on its eastern boundary, we have seen that it takes a very angular form at its northern and southern extremities, between parallels 22° and $23^{\circ} 30'$ S. lat., and between 52° S. lat. and Cape Horn; but for nearly the whole of its length the line is that of the Cordillera, which is generally parallel to the coast, nearing it principally between 29° and $31^{\circ} 30'$ S. lat."

P. 6.—"The Andes with their lofty summits and numerous spurs dominate on the east, whilst on the west the Cordillera de la Costa, or maritime Cordillera, running more or less along the shores of the Pacific, stretches parallel with them. . . . In the following table are compared the altitude of centres of population situated almost parallel one with the other towards the eastern and western borders of the valley, the first slope showing a progressing diminution of altitude, according to the increased latitude, and the second slope comparing the left-hand (or eastern) altitudes with those on the right-hand (or western)."

In this table, which it is unnecessary to reproduce here, there is not to be found a single altitude of points situated to the east of the summit of the Cordillera. The information of the physical aspect of the country is completed by the following words :—

P. 8.—"Of those two lines of Cordillera, the *Andean* is remarkable for its steep slopes, the peaks of its lofty masses covered with snow down to the middle of summer, and for its completely linked chain from north to south, which leaves but few passes easy to cross. The chief of these 'cerros' or mountains (nearly all, with the exception of one here and there, extinct volcanoes or of volcanic origin) are those which are mentioned below with their respective altitudes in the longitudinal branches of the Andes, and with their heights above the level of the Pacific."

P. 13.—"The breadth of the territory forming the Republic between the Pacific and the summit divisory of the waters of the Andes, is not less than 170 kilometres and is not more than 400 kilometres (250 miles)."

* Sinopsis Estadística y Geográfica de la República de Chile en 1892. Santiago de Chile, 1893.

These official documents of Chile herself, the opinion of her most eminent historian, and the diplomatic Report quoted, have all designated the crest of the majestic Andes as her eastern boundary; why, then, did this very same historian when engaged, as the Chilean Expert, in the practical application of the Treaty of 1881 and in the marking out of the line, completely misunderstand that Treaty, and seek a boundary which was never contemplated by those who framed it? The answer is easy. *It is to be found in the lack of geographical information and in the erroneous views as to the elements characterising the traditional natural boundary.*

Reference has already been made to the Chilean Expert's opposition to the proposal of the Argentine Expert for beginning forthwith the fulfilment of their duties by making a survey of the ground through which the dividing line was to run. This opposition was persistently maintained during the whole course of the demarcating operations.

Without the slightest investigation which might permit him to affirm that the physical basis that he was seeking to impose (the continental divide) occurred in the Cordillera de los Andes, which is "the immovable boundary" according to the Treaty of 1881, the Chilean Expert stated that he has considered himself "to be prepared to decide as to a general boundary line from the moment when he first assumed office.* The Argentine Government's point of view was that the surveying of the ground would give to the Experts a clear comprehension of the physical features upon which they were to give their opinion. In presence of these geographical facts, verified and traced upon a plan, the Experts should apply the Treaty, and then it would be known whether the boundary does or does not offer difficulties; should there be no difficulties, they will trace it in a definite manner.†

When there was a question of tracing the boundaries between the British possessions of Canada and the State of Maine, Her Britannic Majesty's Government and that of the United States,—considering that the lack of adequate information as to the topographical features might have hindered the Netherlands Government in their efforts to decide upon the points submitted to them in 1830,—agreed that the fittest mode of elucidating the pending questions and of guiding them to a solution, *would be to draw up a plan of the disputed territory* by means

* Mensaje y Memorias Ministeriales. Santiago de Chile, 1898, p. 13.

† Memoria del Ministerio de Relaciones Exteriores de la República Argentina. Buenos Aires, 1892, p. 251.

of a mixed Commission.* In the present case the Argentine Government held the same views as the British Government. Although this opinion was opposed for many years by the Chilian Expert, it was accepted by his Government on every occasion the question was brought before them, and lastly, on the Agreement of 1896, according to which such differences as might arise between the Experts when locating the landmarks in the Cordillera de los Andes, should only be decided by the Arbitrator, *after a survey of the ground*, thus clearly directing that plans should be made. Had this indispensable operation been executed when it was proposed by the Argentine Expert, this question of boundaries would now be satisfactorily ended.

The Chilian Expert, Señor Barros Arana, and his assistant, Señor Bertrand, considered that the plans existing in 1895, if not exact "were quite sufficient to afford a clear notion of the features of the ground."†

Señor Bertrand added that *for the demarcation of the lines indicated in the Boundary Treaty*, "he, as an engineer, could affirm, that plans would not be required." Mention has been made in previous chapters of the chief geographical documents that existed in 1881 and in 1888, the latter being the year in which the faculties of the Experts to execute upon the ground the delimitation of the boundary were extended; and it has been shown that these plans designated the summit of the Cordillera as the natural limit, and that this Cordillera was cut by rivers which, having their source either on the eastern slope or in the plains, emptied into the Pacific Ocean. Nevertheless, the correctness of those maps has never been supported. Although they are sufficient to convey a general idea of the Andean frontier, and to show the knowledge of Andean orography possessed at that time, it never occurred to the Argentine Government to consider those maps as even remotely useful for determining the points through which the definite line might pass.

The Chilian Expert and his assistant made a serious mistake when maintaining the possibility of determining a frontier of about 2400 miles amongst mountains, without a previous survey which would enable them to lay it down upon a map.

Señor Bertrand knew that the summits of the mountains of the Andes did not coincide with the continental *divortium aquarum* which his chief professed

* North American Boundary. Correspondence relating to the Boundary between the British Possessions in North America and the United States of America. London, 1842.

† Bertrand, Estudio Técnico, &c., p. 12, and Appendix, p. 89.

to consider as the boundary with the Argentine Republic ; he had said that "the valleys of the rivers Palena, Aisen, Huemules and Blanco cross the Cordillera from one side to the other," and that between 51° and 52° S. lat. "all the continental mountain ridges are intersected by the marshy Plains of Diana"; so that it is not difficult to conclude that the opposition to the preliminary survey of the ground reveals that the knowledge to be acquired would be entirely prejudicial to the very boundary that Chilian Commissioners were seeking to impose. The Chilian Expert, Señor Bertrand, then objected, amongst other reasons, that the making of the plans would take a long time;* but this consideration was of secondary importance, since the length of time could be reduced by increasing the number of surveyors, and such an operation would much facilitate the speedy solution of so disputed a question.

This lack of data, which, as will be seen further on, still exists,—notwithstanding the delivery to Her Britannic Majesty's Government of the plans and documents intended to prove the correctness of the Chilian Expert's line,—divests of all geographical value some affirmations of Señor Bertrand, who has not only been the technical adviser of the Chilian Expert, Señor Barros Arana (who never visited the ground), but who is also authorised by his Government to furnish all the information that the Tribunal may require.†

* Estudio Técnico, p. 89.

† The following are some of Señor Bertrand's affirmations :—(1) The continental divide is the only continuous natural line that exists within the Cordilleras ; (2) it is consequently the only natural frontier in those Cordilleras ; (3) this line is susceptible of a rigorous topographical definition, and is easy to apply to the ground ; (4) its depressions, or most accessible points, are natural passes between the two oceanic "vertientes" and those which best lend themselves to the erection of landmarks ; (5) these passes correspond to perfectly defined geometrical positions upon the water-divide ; (6) these depressions characterise the water-divide, *inasmuch as they do not interrupt its continuity* contrary to what is the case with regard to the depressions of any other line ; (7) therefore the said line, topographically speaking, is the only one which may correspond to the idea of main chain (encadenamiento principal), seeing that, in order to classify chains in the order of their importance, the continuous connection between the links is a more essential and closely related condition than any individual condition of them (Estudio Técnico, p. 123).

All these affirmations, and those that follow them, have no other foundation than the very fragile basis derived from a false conception of what is the Cordillera de los Andes. This foundation, upon which rests the edifice raised by the Chilian Expert and his assistants, will be easily shattered as soon as light is thrown upon the incongruous nature of its materials, as its own artizans have already undertaken to show, and as may be gathered from this chapter.

The study of the geography of Patagonia has confirmed that which has been contended by the Argentine Experts, viz. the impracticability of the boundary as proposed by the Chilian representatives, and has demonstrated :—1. That the Continental water-divide is not the only continuous line existing within the Cordillera, as Señor Bertrand himself, and Dr. Steffen amongst others, have stated. 2. That there exists no more unnatural line than the one defended by Señor Bertrand. 3. That so variable is it that it is of impossible application on the ground. 4. The meaning of the fourth affirmation can only be understood on the hypothesis

At the bottom of the boundary question lies a great misunderstanding of geographical facts: owing to lack of information, a confusion of ideas prevails in Chile due in a great measure to preconceived interpretations of the Agreements, which are favoured by those who might have dissipated all doubts by their knowledge of the ground. The resistance to make any survey would necessarily lead to the great differences of opinion, since Nature contradicts the astonishing theoretical interpretation of the Chilian Expert on one of the most important features of physical geography. Facts will prove the truth of the Argentine Expert's assertion that his colleague has considered as the main range of the Andes, marshy and undulating plains in which elevations not higher than Primrose Hill in London are considered as important geographical features, and has thus proposed that the boundary line should run over ground of this character, maintaining that in doing so he agreed with the Treaties.

that the two oceanic "vertientes" (1) were coincident with the crest of the Cordillera, wherein are found the depressions or more accessible points which are the natural passes, and those which best lend themselves to the erection of landmarks. The definitions given by Señor Bertrand "of a line dividing the waters, its crests and its passes," show that when speaking of crests, he alludes to mountains, for he says:—"the first (crests) are the starting points of the lateral spurs or orographic bifurcations whose peaks usually rise to a much greater altitude than the dividing summits" (p. 53). Señor Bertrand would not have made the fourth affirmation had he taken into account the plains or tablelands, such as those where rivers Pico, Frias, Goichel, Coyaike, Aisen, Fénix, Olnie, Belgrano and Mayer have their origin, or the plain of Vizcachas, etc. With regard to the passes, he adds:—"The passes (pasos, boquetes, portillos, portezuelos, which are varieties of *gaps*) have greater importance as indicating the natural point of passage from one slope to the other, and they are *necessary points* in the routes that cross a Cordillera, and by reason of their easy access they are the points which are chosen for erecting landmarks for the demarcation of boundaries." Nothing can be clearer than this reference to a mountain crest, while in almost the whole length of the Chilian line where it passes to the east of the Argentine line, the continental divide runs across the plains and is not clearly defined, as the Chilian explorers who have travelled in these regions have acknowledged; none of the points referred to can even remotely be considered to be a gap in the mountain, as the mountain does not exist. The fifth affirmation falls through before the preceding considerations; the sixth is a vague one, and has no application to this case. Regarding the seventh affirmation, to pretend to see in the *continental divortium aquarum* in Patagonia a "hydrographical chain," is to pretend to see that which does not exist. To see a main chain in the above-mentioned plains, is a curious case of optical illusion. To pretend to see the main chain of the Andes in the plain of Goichel, in the Rio Fénix, etc., is like pretending to see the crest of the Alps in the basin of Paris. To give the name of "crest" or "ridge" to the water-divide between the rivers Vizcacha and Coile, is to suppose that a mountain exists there: and suppositions are not demonstrations. Señor Bertrand says that "the dividing line of the waters ('Estudio Técnico,' page 36) on a mountain ridge is the only continuous and unmistakable one," but when the ridge does not exist neither does the line.

(1) Senor Bertrand once more recognises that the "vertientes" to which the Treaty refers are not sources, but slopes, or "versants."

7. PRELIMINARY EXPLORATIONS IN THE ANDEAN REGION BETWEEN 1888 AND 1898.

Mention has already been made (page 236 and following) to the knowledge of the ground, south of 40° S. lat., at the time when the Experts intended to begin the delimitation work, as established in the Convention of 1888. Señor Bertrand had visited the region near parallel 52° , and had recognised that the continental *divortium aquarum* does not coincide with the *divortium aquarum* of the Andes referred to in Article 2 of the Treaty of 1881, the Cordillera being to the west of the continental divide. The German geologist Dr. G. Steinmann, visited the same region two years before, and considered it to be situated at the eastern foot of the Cordillera,* adding that "the watercourses descending from the eastern slope of the Cordillera discharge into the channels which break through the Cordillera from the west. The watershed between the two oceans reaches an altitude only some few hundred feet"†—an observation similar to that made by Señor Bertrand two years later.

The expeditions, also Chilian, of Señores Serrano Montaner, Vial and Philippi had confirmed that the affluents of the rivers Palena and Calle-Calle cross the Cordillera, flowing from the east, as previous explorers had stated. Nothing was more natural than this: the continental divide, which, up to the north of 40° S. lat. generally occurs along the whole length of the continent between the high mountains of the Cordillera, abandons those mountains towards the east, south of 40° . Therefore, those entrusted with the tracing of the Argentine-Chilian boundary in the Cordillera, in the line of the high summits dividing their waters, should decide at once to investigate the unexplored regions as a preliminary operation, since one of the parties considered that the dividing line ought to pass between the sources of the rivers emptying into the Atlantic and Pacific, for which purpose it was indispensable to know for certain whether such a delimitation could be made within the Cordillera de los Andes. The refusal on the part of the Chilian Expert to make this investigation, maintaining as he did, his preconceived notion of the

* Reisenotizen aus Patagonien in Neues Jahrbuch für Mineralogie, Geologie und Palæontologie. Stuttgart, 1883, p. 255.

† Zeitschrift der Gesellschaft für Erdkunde zu Berlin.

boundary, was one of the causes of the Protocol of 1893, in which the Chilian Government recognised that the sovereignty of Argentina extended to the east of the crest of the main chain of the Andes, and that of Chile to the west, the dividing line to be traced cutting the rivers that crossed this main chain. This clause was agreed to after the full confirmation obtained by the Chilian Government, through official reports, that the main chain of the Andes was crossed by the rivers Calle-Calle (Fernandez Vial exploration), Puelo (Vidal Gormaz exploration), Palena (Serrano Montaner exploration), Aysen and Huemules (Simpson exploration).

The Government of Chile thus accepted the cutting of those rivers. Her Expert, nevertheless, did not follow this course, and continued to maintain his views; but although he persisted in his opposition to the survey of the ground, the accumulation of data against his ideas respecting the Cordillera and the continental *divortium aquarum* became so great, that he ordered a series of those investigations which he had informed the Argentine Expert were unnecessary for the delimitation of the frontier. The more these investigations advanced, the greater were the contradictions between the explorers.

In 1884, holding a commission from the Government of Chile, Mr. Robert Christie undertook an expedition in search of the famous pass of Bariloche, crossing the snow-covered chain extending north and south from Mount Tronador. Subsequently, in the same year, Mr. Christie and Captain Emilio Valverde, of the Chilian Navy—who was also sent by his Government to undertake similar work—*crossed the same chain somewhat further north, and found a river which they thought to be in Argentine territory.* In 1893 Dr. Steffen and Señor Fischer surveyed the Perez Rosales Pass, north of Mount Tronador, and reached a high defile, 1332 metres (4370 feet) above the sea, *situated to the east of the said mountain, which they considered to form a watershed of "the first order."*

On the eastern side the geologist Señor Siemiradzky had meanwhile (in 1892) visited the region near Lake Lacar, and had recognised that it was situated to the east of the Cordillera de los Andes.*

The fresh explorations ordered by the Chilian Expert were to include those regions, and for that purpose Dr. Steffen was commissioned, he being undoubtedly

* An extended reference is made further on to the journey of Dr. Siemiradzky. The Spanish translation of his article, published in the *Anales de la Universidad de Chile* (vol. 45, Santiago 1893), modifies the ideas of the Author as to the situation of the Cordillera.

the most competent explorer to undertake them. He had already made important surveys in the province of Llanquihue, and acknowledged, with Señores Frick, Cox, Fernandez Vial and Siemiradzky that Lake Lacar is situated on the eastern slope of the Andes, although it discharges its waters into the Pacific.* This expedition, in which Dr. Steffen was accompanied by Señores Krüger, Stange, Fischer and Krammer lasted from December 1893 until March 1894, and explored the Rio Palena as far as the longitudinal valley lying at the eastern foot of the Cordillera; it reconnoitred the region where the continental *divortium aquarum*, also to the east of the Cordillera, occurs, and crossed the Andean passes of Puyehue and Ranco, the latter to the west of Lake Lacar, confirming that the Rio Palena receives its chief affluent, the Rio Carren-Leufu, through the Cordillera; that in the valley 16 de Octubre a prosperous Argentine population had been settled for some years past; that Lake Lacar was likewise situated to the east of the Cordillera, and that the surrounding inhabitants were under Argentine jurisdiction. This expedition gave rise to a series of publications, both in Spanish and in German, in which the authors are not consistent with themselves, as will be seen further on.

Dr. Steffen published a work entitled 'Chile and Argentina in the Patagonian Cordillera,'† which affords a new proof of the way of arguing employed by the defenders of the Chilian theory, who alternately speak of the watershed of the Cordillera and of the watershed of the continent, and finally set aside the former, leaving the latter as the only rule to be followed in the delimitation. But such is the impossibility of suppressing that which cannot be suppressed, that even in their own writings the crest of the Cordillera appears here and there and dominates as the dividing line, in spite of all efforts to the contrary. Besides, when they perceive the contradictions to which their proceedings lead them, they strive to extricate themselves from the difficulty by erroneously asserting that the interoceanic divide is always produced within the Cordillera. Dr. Steffen says:—

P. 439.—“With the marking of the boundary in Patagonia stands in intimate connection the interesting question for geographers, whether there are rivers, which have their sources on the high Patagonian plateaux, and which, breaking through the Cordilleras in their entire width, flow into the great ocean. As to the river system of the Palena and

* Petermann's Mittheilungen, 1894, p. 145 *et seq.*

† Geographische Zeitschrift, Leipzig, 1895, vol. i., p. 436 *et seq.*

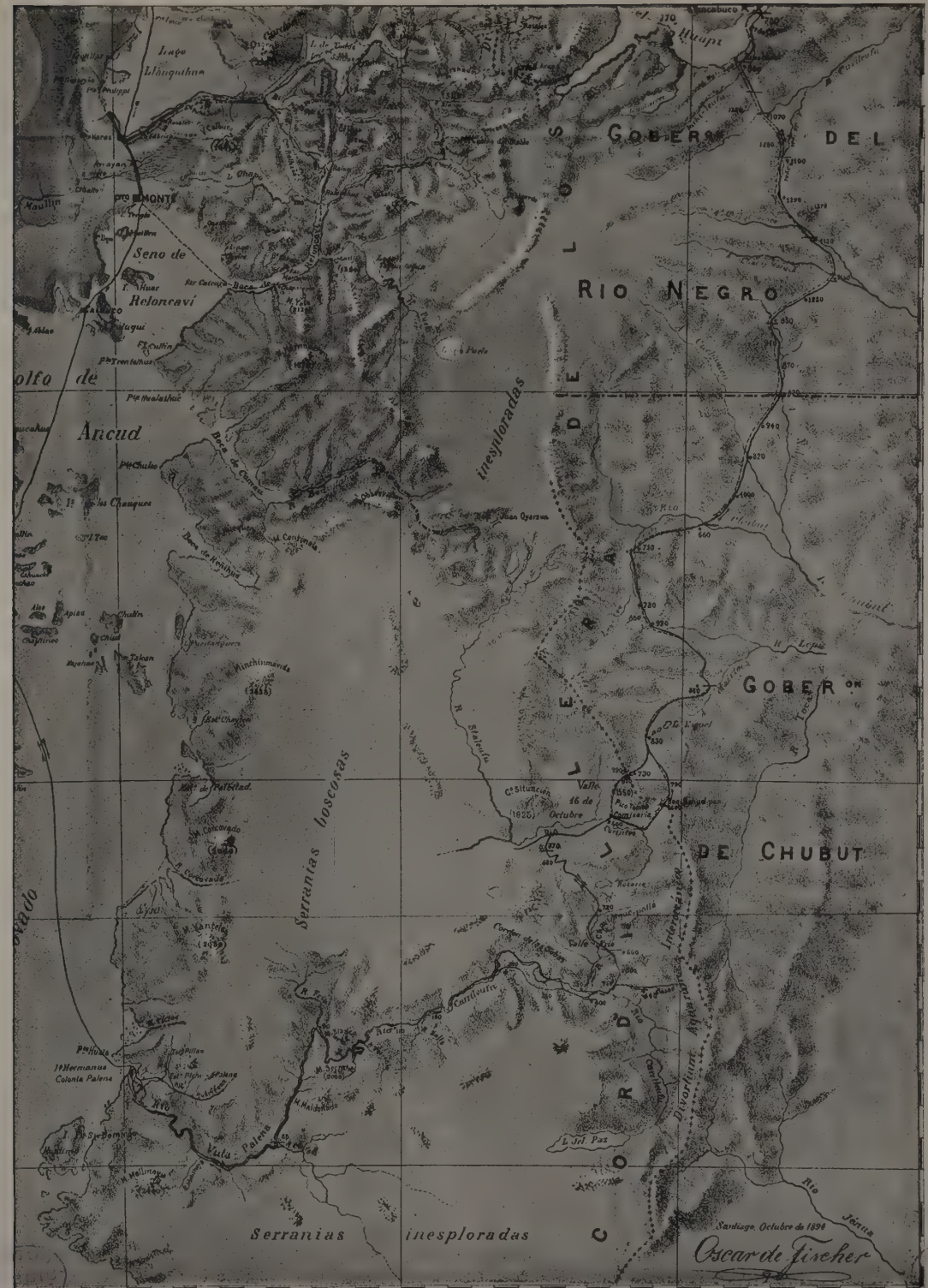
the Puelo, the great eastern tributaries of the Reloncavi fjord, it is shown that they take their rise in the important high ranges included as integral parts of the Cordilleras; their springs wear through in part to the lower passes (boquetes) which lead over these high chains to the high open plains called in the district 'Pampas.'

When the geographers whom Her Britannic Majesty's Government is to send to examine the ground, report the results obtained from their exploration, the Tribunal will know whether this assertion is correct or incorrect, whether all the waters that flow down to Rio Puelo take their source in the Cordillera, and whether the same is the case with those of the Rio Palena.

Though in their due place the contradictions between the observations of Dr. Steffen's colleagues respecting the orography of the region visited will be more amply dealt with, it is well to consider now the maps published by Señor Fischer and by Dr. Steffen, after their exploration.

The first is entitled "Carta General de la region reconocida por la expedicion exploradora del Rio Palena en Enero, Febrero y Marzo de 1894. Santiago, October 1894. Oscar de Fischer" (Plate XV.). The name "Cordillera de los Andes" is not in its proper place, as it appears over the great *eastern longitudinal valley* outside the Cordillera, and over the valley 16 de Octubre. Close to this name, and sometimes cutting it, is drawn the frontier line in the interoceanic *divortium aquarum*, mountains which do not exist being depicted to the east of Lake General Paz and of the wide plain of Cholila. The second map, entitled: "Uebersichtskarte des Chilenisch-Argentinischen grenzgebiets zwischen 40° 30' und 44° S.," is by Dr. Steffen. The entire name "Cordillera de los Andes" is set down to the east of the region where the snow-covered mountains actually exist. It appears that the author of the plan, by an oversight, considered as synonymous the Cordillera de los Andes and the continental *divortium aquarum*, and, based on that error, he has depicted the said *divortium* as a continuous ridge of mountains, although this is not to be found on the ground. Thus, the most prominent mountains are drawn in the vast plain of Epuyen, connecting the Cordon de los Castillos with Pico Thomas, a drawing by means of which the Colonies Valle Nuevo and 16 de Octubre appear to be situated to the west of the Cordillera de los Andes, and, therefore, in Chilean territory, thus converting the Argentine Police Station of 16 de Octubre into a Chilean post. The following considerations taken from Dr. Steffen's article deprive the map of any value:—

P. 439.—"With reference to the two great streams flowing towards the south, the river Aysen and the river Huemules, the opinion has circulated since the journey of the



OSCAR DE FISCHER, 1894.

[Fisc p. 542]

(From "Carta General de la Region reconocida por la expedicion exploradora del Rio Palena.")



HANS STEFFEN, 1897.

[Face p. 542.]

(From "Uebersichtskarte des Chilenisch-Argentinischen Grenzgebiets," 1897.)

Chilian Captain Simpson, that they sprang out of the 'Pampa,' and that their sources lie at a distance of at least 150 kilometres east of the chain of the Andes. But whoever examines carefully and critically the report of Simpson on his journey, and possesses any information himself concerning travelling in the region of the primeval forests of the Patagonian Cordilleras, will remain in doubt as to the truth of this assertion, until by a complete exploration of the said rivers (up to the watershed itself), the proof of it is obtained. All expeditions, whose leaders were satisfied to explore the more or less navigable part of a West Patagonian river, and then perhaps pushed forward another one or two days' journey overland, and by ascending the wooded side of the valley hoped to obtain a view over the region of the river sources, have returned with a superficial idea of the structure of the Cordilleras which are greatly developed also in breadth. Only an elevation above the forest region can give a sufficient idea of the orographical characteristics of this mountain world; otherwise, the advancing party is deluded by far extended alluvial plains of the valley bottom, covered with impenetrable forests, often deceived concerning the true course or direction of the visible mountain chains, and they suppose themselves at the end of the range, while they have, in fact, wandered through a great wide valley in the midst of it."

The conclusion to be drawn from the surveys of Dr. Steffen and his colleagues, made under the unfavourable conditions to which the explorer himself refers, is that they did not suffice to give them an idea of the mountainous country that they crossed or left to the west, and on that account they considered as mountains even the trifling undulations resulting from glacial drift, whilst they did not pay any attention to the great Cordillera. Dr. Steffen further adds :—

P. 440—"As far, therefore, as authentic investigations up to the present time reach, we must answer the above-mentioned question in the negative, and I think that we shall not be too hasty if we place the valleys of the Aysen and Huemules, for analogous reasons, in the category of the rest of the penetrating river valleys of West Patagonia. The danger that the Boundary Commissions would find themselves in the position, according to the watershed principle, of being obliged to look for the line outside the mountain system of the Andes seems to me to be out of the question."

The deficient information of Dr. Steffen leads him into an error. Although he omits the word "Cordillera," and replaces it by "system," he will never be able to say that the river Aysen has its eastern sources within the system of the Andes. The necessity of extending that system to a region extraneous to it in order to consider as Western Patagonia every part irrigated by waters that normally or abnormally flow into the Pacific, causes Dr. Steffen to contradict himself, as appears from the comparison of the passage quoted with the following :—

P. 440—"What has rendered the dispute more acute between the two Republics interested in Patagonia, is the fact that one of the great eastern longitudinal valleys, which is sunk in between the water-dividing heights and the *central mountain mass*, and which doubtless contains the most valuable lands in all Patagonia, has been taken possession of by the Argentine side, although its waters pierce through westward to the Pacific Ocean. Already, in the year 1886, Fontana, the explorer, was authorised by the Argentine Government to found a farming colony in the spacious 'Valley of the 16 de Octubre,' on the bank of the river Fetaleufu, which possibly belongs to the hydrographical system of the Palena, possibly to another river system lying further north. From this settlement has developed the flourishing 'Colonia del 16 de Octubre,' peopled by Welshmen from Rawson's Colony, at the lower Chubut, which again recently has excited special interest on account of the discovery of gold on the river Corintos, at the head waters of the Fetaleufu.* Further south also, in the valley of the upper Carrileufu, which forms the head branch of the Palena, there is a beginning of Argentine colonisation, and finally, by my journey undertaken in the summer of this year for the exploration of the river Puelo is demonstrated the existence of settlers in the upper Puelo district. The closing up of these valleys on the west by the *succession of snow-capped massifs of the central Cordilleras* is the reason why the colonists mentioned were as good as unknown in Chile, and were first discovered by difficult river expeditions from the western side."

If there exists a great longitudinal valley, between the water dividing heights and the central mountain mass, it is because the crest of the Cordillera de los Andes, formed by this central mass, is that which separates Eastern from Western Patagonia. All those valleys where the Argentine settlements referred to exist, must necessarily be situated within Argentine territory, since they lie in a region shut in "on the west by the succession of snow-capped massifs of the central Cordilleras," a wall which, according to Dr. Steffen, prevented Chile for many years from being aware that in those valleys there existed colonies under Argentine jurisdiction. Nevertheless, in Dr. Steffen's map, the same valleys are depicted to the west of the Cordillera de los Andes.

It is also to be observed that the explorers in the service of Chile did not then conceal the chief reason for maintaining that the Argentine-Chilian boundary should follow the continental *divortium aquarum*, even though it might not be situated within the Cordillera :—

P. 440.—"The precipitous western slope of the Patagonian Cordillera towards the bays and fjords of the ocean and of the inland sea of Chiloé, offers almost no enticing lands to the settlers. With the exception of the small inhabited coast stations on the gulf and

* On this subject see pamphlet by A. Von Heyking, *Las Aluviones Auríferas del río Corintos*, Buenos Aires, 1894.

fjord of Reloncavi, there exists to the south only the Chilian Colony, founded by Governmental decree on January 4, 1889, on an island at the mouth of the Palena,* which at a future time may attain importance as a shipping station and point of outlet for the inner valleys of the Palena. Further stretches of the coast are still almost quite unknown, like the part between the Boca de Reñihue and the Palena, for which indeed the English charts still depend on the information given by the Spanish officer of Marine, José de Moraleda, at the close of last century. For the first time quite recently the Chilian warship *Pilcomayo*, undertook measurements on the east coast of Chiloe and the islands of the inland sea, which are to be gradually extended to the opposite coast of the mainland.

“By the contrast between the value for culture of the *eastern part and that of the western part of the Cordilleras*, it can be understood that it is an important matter for the Chilian Republic to save for herself the valuable inner valleys which, by regulation of the boundary according to the water-parting principle, must undoubtedly fall to her. On the other hand, for the Argentine colonists, or colonists under Argentine authority, *living at the eastern foot or in the eastern valleys of the Cordilleras*, it is a ‘life-question’ to preserve a road to the Pacific coast, about 120 or 150 kilometres distant, to avoid being obliged to travel over the waste of Patagonian plateaux to the east coast, a distance four or five times greater, or northward by one of the known navigable rivers towards Chile.”

The attention of the Tribunal is called to this important confession of Dr. Steffen : what Chile pretends are some Argentine settlements on the *eastern foot or in the eastern valleys of the Cordilleras*. The simple enunciation of such a claim suffices to make apparent that it cannot be successful. As regards the facilities of access by the west, which Dr. Steffen indicates, his own words contradict him. Were access easy on the side of the Pacific, how could Chile have been unaware of the existence of those Argentine colonies? Why did the settlers come to the eastern foot of the Cordillera by the Atlantic side instead of doing so from the side of the Pacific? The distance is less indeed between the mouth of Rio Palena and the valley of the Carren-leufu than between the latter and the Atlantic; but it is likewise a fact that the difficulties of the journey from the Pacific side are enormous, whereas from the other the country is flat, the continental divide is insensibly crossed, as the Chilian geographers have stated, and trade communication is permanent.

Whatever advantages the possession of the eastern valleys of the Cordillera might bring to Chile—Nature, tradition and Treaties oppose against this a wall as gigantic as the Cordillera itself.

In 1895 Dr. Steffen and Dr. Krüger undertook another expedition, and

* Dr. Steffen refers to the colony in which the Argentine Expert only found six adults, p. 528.

explored the River Puelo as far as the Valle Nuevo, situated to the east of the Cordillera ; and in 1896 Dr. Steffen surveyed part of the country watered by River Manso, the principal affluent of the Puelo.

In a Report * of this journey he says :—

“ The river Manso, as well as the Palena and the Puelo, *pierces through several chains of the Cordilleras in narrow defiles which make progress through the waterway impossible.* In its upper waters, on the other hand, it flows through broad open valleys which lie between the water-dividing Cordilleras (in the east) and the central mountain masses (in the west), and contains tracts splendidly suited for cattle breeding. From the Argentine side colonists have advanced as far as the Upper Manso valley, and have made use of the extraordinary drought of last summer, by burning down the undergrowth and the high grass of the open valleys, as well as the beech woods and coligue thickets of the heights. Our expedition met in the open Manso valley great herds of wild cattle, which, *excluded from Chile by the high cordilleras*, and from the east by the rapid river, must have lived here during many decades—perhaps the remains of the cattle stock of former Indian settlers. The whole of the scenery recalls vividly the landscape described by Musters of those cordillera valleys in which he hunted the wild bull with the Indians. The mountain ranges which form the shores of the river Manso can be climbed without difficulty ; the greatest heights to which we were obliged to ascend in order to get to the open valleys of the upper river reached about 1630 metres. The water-dividing cordillera rises precipitously in rugged indented towering chains to more than 2000 metres, but is full of broad gaps in which lie convenient passes to the open Patagonian upper plains.”

The existence of Argentine settlements to the east of the “central mountain masses,” and the absolute isolation from Chile of the lands visited by Dr. Steffen, may contribute to determine whether the boundary is to be traced in these “central mountain masses,” or in what Dr. Steffen calls the rugged indented towering chains of the east, full of broad gaps in which lie convenient passes to the open Patagonian upper plains ; chains which are not more than the heads of the cretaceous beds which form there generally the edge of the table-land.

Dr. R. A. Philippi, Director of the State Museum of Santiago, who is well acquainted with all the results of the Chilian investigations, wrote at that time a Report on the orographical and geographical differences between Patagonia and Chile,† which affords sufficient information to prove that the Chilian Expert is

* Geographische Zeitschrift, vol. 2, 1896, p. 352.

† Remarks respecting the Orographical and Geographical difference between Patagonia and Chile. By Dr. R. A. Philippi, Director of the State Museum in Santiago (Chile). Zeitschrift der Gesellschaft für Erdkunde zu Berlin, vol. xxxi., 1896, p. 50.

in error when maintaining that the continental divide harmonises with the main chain of the Andes, and to demonstrate the inaccuracy of the maps of Señores Fischer and Steffen. After dividing the Chilian territory into four parts, and describing the first two, he says :—

P. 51.—“To the south of Puerto Montt the high Cordillera penetrates immediately into the sea without any foreland. The fourth part of the land is nothing but the steep slope of the mountain chain, fore-lying islands, and a strip of land east of the Andes as far as the water-parting between the two oceans; a strip of land which runs often pretty far east of the mountain system.”

At this point Philippi appends a foot-note in which he says :—

“This strip of land, of rich pastoral value, is that which has, down to the most recent time, been claimed both by Chile and Argentina. The old frontier Treaty stipulates, namely, that the boundary shall be the watershed which is formed by the high Cordillera. The shrewd diplomatists, however, who concluded this Treaty, held fast the opinion that a watershed was invariably shaped like a roof, sloping down on both sides, and always occupied the highest points between two water basins. However, that is not the case, and the Chilians said, ‘My land reaches as far as to this point, for here is the watershed.’ ‘No,’ answered the Argentines, ‘you want to take away a piece of our land, for our land reaches to the crest of the Cordillera.’ The frontier is now being regulated in a friendly manner. In this debatable land-strip, and in the latitude of Valdivia, lay the piece of land on which, several years ago, a German Company from Buenos Aires wanted to establish a German Colony.”

Dr. Philippi adds :—

P. 55.—“4. The water-parting between both oceans lies, in southern Chile, *to the east of the Cordillera, and is very low.* In the region of the lake of Villarica, e.g. it is but 500 m. (1660 ft.) high. Many, I might almost say all the larger, rivers of Chile rise *to the east of the Cordillera*, and flow a stretch northward or southwards, parallel with the mountain chain, till they meet with an often very narrow cutting through which they make their passage to the Pacific. On their way they almost invariably form a large number of rapids, rendering it very difficult for one to push his way by water or even by land from their lower to their upper course. It is entirely the reverse when one travels from the east coast of Patagonia to the Andes. Without difficulty he mounts quite gradually with his ox-carts to every higher ground *and often crosses the water-parting without ever being the least aware of it*, till, to his complete astonishment, he notes that, before he has reached the foot of the Cordillera, the waters are no more flowing to the Atlantic side. On these remarkable circumstances, the labours of the Commission appointed in common by Chile and Argentina to settle the frontier will throw light.”

These last passages are decisive. The difference existing between the high mountains drawn by Señores Fischer and Steffen as forming the continental

water-parting in Patagonia and the lands that are so easy to cross in the continental divide, described by Dr. Philippi, is worthy of attention.

In 1897, Drs. Krüger and Stange explored the Reñihue pass and at the eastern foot of the Cordillera the lacustrine region which feeds the Fetaleufu river, reaching the open lands, and crossing the continental divide in that longitudinal valley, where Señores Fischer and Steffen had represented on their maps an important range. As the Report of Drs. Krüger and Stange will be quoted somewhat extensively further on, it will be sufficient here to give some of the paragraphs from the Article on their explorations* published in German by Dr. Krüger :—

“The opening of the Patagonian Cordillera, which up to its snow-line is covered with impenetrable primeval forest, is limited to the exploration of a series of river systems discharging into the Pacific Ocean. These take their rise *in a spur of the chain far advanced to the east*, and in mighty erosion furrows *break through the chain in all its entire breadth*. Even the most powerfully developed chains are, irrespectively of their geological constitution, traversed in deep gaps. These through-cutting valleys, as they are reputed to be, constitute the natural highways into the interior. The utilisation of the waterways is, however, thanks to rapids, falls, and other obstructions, confined to comparatively short stretches. . . . From the sea coast there are deep cuttings running into the land, possessing the typical formation of fjords, i.e. an inaccessible steep coast with lateral arms, islands, cliffs and great depths of sea.

“On all hands are seen abrupt walls, occasionally void of vegetation, down which plunge waters in the shape of cascades. From the fjords open out the great river-ways leading into the interior, the most important of which are called Puelo, Vodudahue, Reñihue, Chaiten-Yelcho, Corcovado, Canef, Palena, Aisen and Huemules. Only the half of these are explored. The lower course of the river, the valley of which measures several kilometres in breadth, is for steamers of moderate draught mostly navigable without impediment. The river describes many bends, shows islands, and is framed in with high alluvial banks exuberant with magnificent primeval vegetation. Splendid woodlands line the long serpentine folds of the river: lofty timber, thick quilanto and coligue bush vary with one another or interrupted by extensive fields of the large-leaved Nalca shrub.

“Thereupon follows the region of the rapids which may be passed only by strong rowing boats managed with great skill. It is a characteristic of all the mountain rivers of the Southern Cordillera that shortly before each bend of their course they pile up a great quantity of stones, tree-trunks and other obstacles, inducing the formation of sharp currents and whirlpools. Mighty rocks protrude occasionally across the river bed, and give rise to a series of rapids following one another, now at shorter, now at wider intervals. The passage of these rapids takes the utmost courage and skill of the crew. The vessels often require

* West Patagonia and the Expedition for its Exploration, by Dr. Paul Krüger, Santiago in Chile. From ‘Globus,’ vol. 71, Feb. 20, 1897, pp. 117–118.

to be unladen and carried for certain stretches overland. Occasionally the rapids assume still more complicated forms. Tree-trunks carried down by high water get stuck in the bed of the river and massed together in heaps, form barricades as much as a kilometre long in the middle of the current, between which the water shoots its way, foaming and surging in whirlpools."

It is easy to deduce from this quotation that the continental divide occurs to the east of the main chain of the Andes, and that while there is facility of access from the east to the longitudinal valley situated at the eastern foot of the Cordillera, this valley is shut off on the west side, so much so that its existence was unknown in Chile.

Moreover, if in this paragraph Dr. Krüger speaks of narrow passes which lead to the Patagonian plain across the continental divide, in another Report published in the same volume of the "Globus" * he has said :—

"Of particular interest is the course of the continental divide within the territory travelled over. In the northern part the divide is formed by the Maitén chain; in the southern, by the Leleque chain. The distance between the two, amounting to about 20 kilometres ($12\frac{1}{2}$ miles), *is occupied by a great plain covered with pampa grass. In this plain the water-parting is in a hilly curve of rising ground opening on the north and north-east side.* There is no such thing as a pass proper or boquete between the Chubut running to the Atlantic Ocean and the Cholila valley draining to the Fataleufu, as the transversal would have to flow to the enclosing Cordillera. But there is an opening in the valley which runs in a longitudinal direction to the enclosing chains. *Rivers take their source in that part of the water-dividing line running in the pampa-like territory.*"

Dr. Steffen at the same time confirmed his former statements, in a Report he published on recent explorations in the Patagonian Andes. Speaking of the Valle Nuevo, situated to the east of the true Cordillera, † he says :—

"It is a valley with singularly beautiful scenery, bounded on the west by a continuous succession of elevations covered with snow, bearing hanging glaciers, and rising in some places to a height of some 6500 feet. On the east the horizon is shut in by bare ranges, which occasionally indeed rise to the height of the snow line, but are interrupted by broad passes, to which the traveller ascends up the steps of the valley, which succeed one another with great regularity.

"The exit from the Valle Nuevo to the open Patagonian plateau, that is, into a river basin drained into the Atlantic Ocean, is by no means so difficult as the passage of the *angosturas*, and of certain secondary passes in the western part of the Cordillera, but still a considerable ascent from the western side and a descent on the eastern side have to be

* "Globus," vol. 71, May 22, 1897, pp. 331-332.

† On Recent Explorations in the Patagonian Andes, south of 41° S. lat., by Dr. Hans Steffen, in the Scottish Geographical Magazine, vol. 13, Edinburgh 1897, p. 70.

encountered in crossing the interoceanic watershed. The *boquete* we visited, which parts the waters of the northern feeder of Lago Superior from those of the Rio Maitén, a stream belonging to the Chubut system, is a platform broken occasionally by caldron-shaped depressions, and lies 2790 feet above sea-level, 2035 feet above the surface of the lake that feeds the Puelo, and 1380 feet higher than the houses of the small settlement in Valle Nuevo."

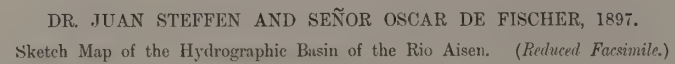
In 1897, Dr. Steffen, accompanied by Señor Oscar de Fischer and Dr. Dussen, explored two of the three principal branches of River Aisen as far as the Patagonian plains.

Facsimiles of the two sketch maps of the expedition are given here. The one of Señores Steffen and Fischer (Plate XVII.) shows how incomplete were the data gathered by the explorers, and depicts no mountains in some of the places where the continental divide is produced. The second, that of Dr. Dussen, shows the Cordillera de los Andes in its proper place and indicates the sources of the Rio de los Prados, that is to say, river Coyaiken in the transversal depression of the table-land, far to the east of the Cordillera. There also the explorers met Argentine colonists, and Dr. Steffen * could say that—

"The expedition has explored the river region of the Rio Aisen up to the region of its origin, and has formed a sure judgment on the geographical situation and the orographical relations of the zone which forms the continental divide. As a consequence, the surprising fact has become clear that the Aisen, with its branch-work of springs, *penetrates far into the eastern tableland of the sub-Andean ridges, and passes through the whole breadth of the Cordillera in a valley system with many branches.* The assertion of the Chilian Captain Simpson, occasionally doubted by me, concerning the going back of the watershed into the open pampas land, holds good to a certain point on the right hand, though Simpson, whose traces the second division of our expedition could sufficiently follow as far as his last camping ground, did not get nearly beyond the forest region of the Cordillera, and could only ground his results on conjectures, not on a study of the region of the watershed itself. The difficulties which arise here from the practical question of the determination of the boundary I shall in this place no further discuss."

The fact pointed out by Dr. Steffen has an important bearing on the boundary question, since he acknowledges that the continental divide occurs *far into the eastern tableland of the sub-Andean ridges*, until where, according to him, the river Aisen penetrates. Dr. Steffen still speaks of the *sub-Andean* ridges because he approached the River Senguerr by a hilly country; if he had crossed three miles further south he would have met the broad plains and the swamps of Goichel where the so-called continental divide exists at present. In returning

* Verhandlungen der Gesellschaft für Erdkunde zu Berlin, vol. xxiv. 1897, p. 472.



In 1898 Dr. Krüger ascended the course of Rio Corcovado as far as its rise, and Dr. Steffen inspected the course of the Rio Cisnes up to its eastern source in the Rio Frias, where he could observe once more the fact that the continental divide was situated far to the east of the Cordillera de los Andes. Señor Alejandro Bertrand, in the same year making his way through Last Hope Inlet in the vicinity of 52° S. lat., crossed Patagonia from the south to the north as far as 36° S. lat., *without however penetrating into the Cordillera at any point.*

KARTA
RIVER OF
RIO AISEN

P. DUSCH

Scale 1:200,000

MAP OF THE RIO AISEN.

From Frán Patagoniens vestkust till pampasområdet på Kordillerans Östra Sida, Af. P. Dusen, Ymer 1897.

works of the different surveyors in the Chilian service and even between the opinions of the same explorer, as expounded in different reports, leads to the conviction that their efforts to harmonise the preconceived views of the Expert, Señor Barros Arana, with the physical features have been totally unsuccessful. It has been of no avail that some of them depict in their maps gigantic mountains where there are only valleys or plains; it is also useless that they suppress the Cordillera. The true Cordillera de los Andes will always stand where it rises, and the position of the depressions, valleys and plains will not be altered, whatever description the maps may give.

These contradictions, moreover, have prevented the Chilian Expert from grasping an accurate knowledge of the frontier regions, and, therefore, he has followed his theoretical conceptions, disregarding geographical elements. The Argentine Expert, on the contrary, has been always guided by the stipulations in the Treaties and by the actual features of the ground. The divergences between both Experts were thus originated in the different procedure they adopted.

While these Chilian expeditions were obtaining the information which, in the commencement of the boundary operations the Chilian Expert and his adviser considered unnecessary for tracing the divisional line, but which they ultimately endeavoured to acquire, Argentine expeditions, more or less connected with the boundary question, visited the Andean regions.

In 1876 and 1880, Dr. Moreno explored several parts of those regions between 39° and 43° S. lat., and ascertained in 1880 that the continental water-parting in the neighbourhood of 43° was situated, not in the Cordillera but in a lateral ridge. From 1881 to 1883 the Argentine army subdued the Indian tribes living at the eastern slope of the Andes as far as 43° S. lat. In 1886 Señor Fontana reached the lake which bears his name, and founded the colony of 16 de Octubre at the eastern foot of the Cordillera. In 1887 Señor Castillo visited the lacustrine region extending from Lake Argentino to Last Hope Inlet. In 1888 Señores Moyano and Ezcurra, sent by the Argentine Government, visited the country from 16 de Octubre to Lake Fontana, and Señores Steinfeld, Botello and Moller of the La Plata Museum, crossed the region from lakes Fontana and La Plata to Santa Cruz, discovering the source of the river Aisen in the table-land. In 1887, the cultivation in the longitudinal valley 16 de Octubre was commenced, and in consequence, various commercial expeditions were undertaken, especially that of the Southern Land Company,

to portion off the lands sold to it by the Argentine Government. Settlements in different points to the east and west of the continental divide, but always to the east of the Cordillera, were formed, and gold prospectors began to look for the auriferous alluvia of the eastern foot of the Andes, as, for instance, did the Gold Company of Rio Corintos.

Besides the Chilian and Argentine Explorations in southern Patagonia, mention must be made of those of Mr. J. B. Hatcher, of Princeton University, who travelled in the western part during the summer and autumn of 1896, and afterwards during 1897. Mr. Hatcher explored an extensive region where the continental divide occurs, and can therefore speak from personal experience on the general structure of the Cordillera de los Andes and on the conditions of the continental divide. The accompanying facsimile of the sketch map, which he published in 1897, shows the Cordillera cut by the river Mayer, a river which Mr. Hatcher discovered and named, rising on the table-land of Patagonia and flowing to the Pacific. In another report it is stated by the same authority that the lacustrine system which to-day drains to the Pacific Ocean is situated to the east of the main chain of the Cordillera.

In 1896, Dr. Moreno the present Argentine Expert, made another expedition from the city of Mendoza to Lake Buenos Aires, accompanied by several topographers and geologists, who surveyed a considerable portion of the eastern slope of the Cordillera, adding numerous and important data to Patagonian geography and geology.

In 1897 two members of the Argentine Boundary Commission carried out a survey of the region comprised between Lake Fontana and Lake Buenos Aires; and in 1898 a large number of topographers of the same Commission explored and drew up preliminary plans *of the entire eastern slope of the Cordillera*, from 41° to 52° S. lat.

These regions have been developed under the protection of Argentine laws: large areas of land have been sold or rented in the eastern slope of the Andes and neighbourhood, settlements were formed, military posts replaced by civil authorities, schools founded, and communication established between the different centres. Chile was naturally unacquainted with those lands owing to their geographical position, and did not pay any attention to the existence of those settlements, nor to their continuous development, notwithstanding that she knew all these facts, which were officially published by the Argentine Government.

Meanwhile the work of the boundary commissions proceeded with more or less difficulty on account of the unacceptable claims of the Chilian Expert.

These parties proceeded in 1898 to the south of 40° S. lat. The Argentine



MAP OF PATAGONIA ILLUSTRATING EXPLORATIONS OF J. B. HATCHER, 1896-'97

From National Geographical Magazine, vol. viii. p. 311, Washington, 1897.

Commission made, by water and by land, a preliminary survey as complete as was possible within the short period fixed at the meeting of May 1, 1897.

The Argentine steamers 'Azopardo' and 'Golondrina,' visited the western coast; the former inspected the extensive Calen Inlet and the rivers Colihue and Toro, discovering the important Las Heras river which drains into that inlet, and visited the Bodudahue Inlet, Piti Palena Inlet, Payuhuapi channel, Aisen Inlet, and Last Hope Inlet. The second discovered several inlets which penetrate towards the east, between the mountains to the south of Calen Inlet. Both boats were at the disposal of the Argentine Expert, and assisted the Argentine expeditions, which reconnoitred the Bodudahue, Palena, Claro, Queulal, Cisnes, Aisen, Las Heras and Trinidad rivers.

On the east side the surveys were hastened, and at the time agreed the Argentine Expert was enabled to draw up the boundary line according to the Treaties; but the Chilian Expert was not, as has been stated in Chapter XII., in the same position, as his surveyors had only explored a small part of the Cordillera south of 40° S. lat. They inspected certain points *where the continental divide is discernible, without penetrating into the Cordillera* except at the point between lakes Todos los Santos and Nahuel-Huapi, where they crossed it. Plate X. gives sufficient idea of the two lines proposed at the meetings of August and September 1898, and it is convenient to compare it with the Sketch Map on page 353, which shows the extent of the work of the Chilian Commission. The extent of the Argentine work is shown on the Sketch Map, page 352.

With these maps, which speak for themselves, and with the data contained in this Chapter regarding the different opinions held by the Chilian Explorers, it is easy to observe how impossible it was for the Chilian Expert to make any accurate assertion regarding his projected line, since in some sections the ground was utterly unknown to him and his assistants, and in some others the contradictions between the surveyors under him are of such a nature, that it would be hazardous to base upon their labours any definite conclusion. Señor Barros Arana must, therefore, have found himself in an embarrassing position, when he was obliged to declare to his Government that the whole of his line was situated in the Cordillera de los Andes, as ordered by the Treaties, and in the form which they establish.

8. INUTILITY OF INACCURATE MAPS.

The Chilian Expert and his technical adviser have had an unquestioning and abiding faith in erroneous maps, which they have considered as more important evidence than the surveying of the ground over which the boundary is to run, and even now, when this survey has been made, they continue to seek for those maps as proofs against the geographical facts which entirely support the Argentine line. Neither Argentina nor Chile, when agreeing to the boundary on the edge of the Cordillera de los Andes, have looked on maps: the frontier was imposed by itself. The limit along the mountain range was not arrived at as a consequence of cartographical work: the law of nations and the patrimony of the two countries pointed to it, as no other better division of the inheritance from Spain could be sought for. Maps were used only as helps to appreciate certain features of the range, but never have the indications contained in them preponderated over the traditional natural boundary. The coincidence of the continental divide, with the summit of the Cordillera as depicted in some maps, has no value at all as a proof that this divide was ever accepted by the parties. This coincidence only proves the complete unaquaintance of the cartographers who drew those maps with the true physical character of the range, while other maps showing the water-gaps in the same, reveal that their draughtsmen had more knowledge of the ground. The maps in which ancient conceptions on mountain ranges are applied to unexplored countries, have not the least importance in the tracing of a boundary according to Treaties that had not those maps in view.

In earlier times the uselessness of that class of maps * was recognised :—

“Maps are from the nature of them very slight evidence. Geographers often lay them down upon incorrect surveys, copying the mistakes of one and another; and if the surveys be correct, the maps taken from them, though they may show the true position of a country, the situation of islands and towns and the course of rivers, yet can never determine the limits of a territory, which depend entirely upon authentic proof; and the proofs in that case, upon which the maps should be founded to give them any weight, would be themselves a better evidence, and therefore ought to be produced in disputes of this nature, in which the rights of kingdoms are concerned.”

* The Memorials of the English and French Commissaries, concerning the limits of Nova Scotia and Acadia. London, 1755.

During the negotiations for settling the boundary in Oregon territory* maps were frequently mentioned, and it would be well to quote what is said about their use by Travers Twiss :—

“The difficulty in executing the provisions of Boundary Treaties in America, has arisen chiefly from adopting the data which incorrect maps have furnished, to which there has been nothing in Nature corresponding, and from agreeing to contain parallels of latitude, as appearing from those maps to form good natural frontiers, but which have been found upon actual survey to frustrate the intentions of both parties. . . .

“A map can furnish no proof of territorial title: it may illustrate a claim, but it cannot prove it. The proof must be derived from facts, which the law of nations recognises as founding a title to territory. Maps, as such, that is, when they have not had a special character attached to them by Treaties, merely represent the *opinions of the geographers* who have constructed them, which opinions are frequently founded on fictitious or erroneous statements.”

These words apply fairly well to the maps which have been used by the Chilian Representatives as enlightening documents in the Argentine-Chilian boundary question. A few examples will show the result of explaining the physical features according to some of the known maps.

The “*Mapa Geográfico de América Meridional dispuesto y gravado por D. Juan de la Cruz Cano y Olmedilla*,” published in Madrid in 1775, contains erroneously the words “Reino de Chile” (Kingdom of Chile) in the territory south of Mendoza and “Chile Moderno” to the south of 45° S. lat. in the Andean region. These names are clearly misplaced. Moreover, one year later the “Virreinato del Rio de la Plata” was erected, and the Spanish Sovereign ordered that the summit of the Sierra Nevada or Cordillera de los Andes should be the limit between his possessions on the Pacific side and those on the side of the Atlantic; yet, during the discussion which preceded the Treaty of 1881, this map was mentioned by Chile as favouring her claims to territories east of the Andes. It however furnishes no proof of the rights of Chile to these territories, and merely represents the opinion of the author, a compiler of geographical documents, who was not in a position to judge of their relative value.

Besides, on this map we see marked on sheet No. 5 in 39° S. lat., Lake “Huenchun-Layquen,” also called “Lago del Límite,” i.e. lake of the Boundary. And to what boundary can it refer if it is not to the Cordillera de los Andes

* The Oregon Question examined in respect to facts and the Law of Nations. London, 1846, pp. 212 and 305.

that is drawn to the west of the lake? Sheet 7, given here in facsimile (Plate XVIII.), shows with some accuracy the geography of Patagonia as it was known at that time, chiefly through the Reports of the Jesuit missionaries.

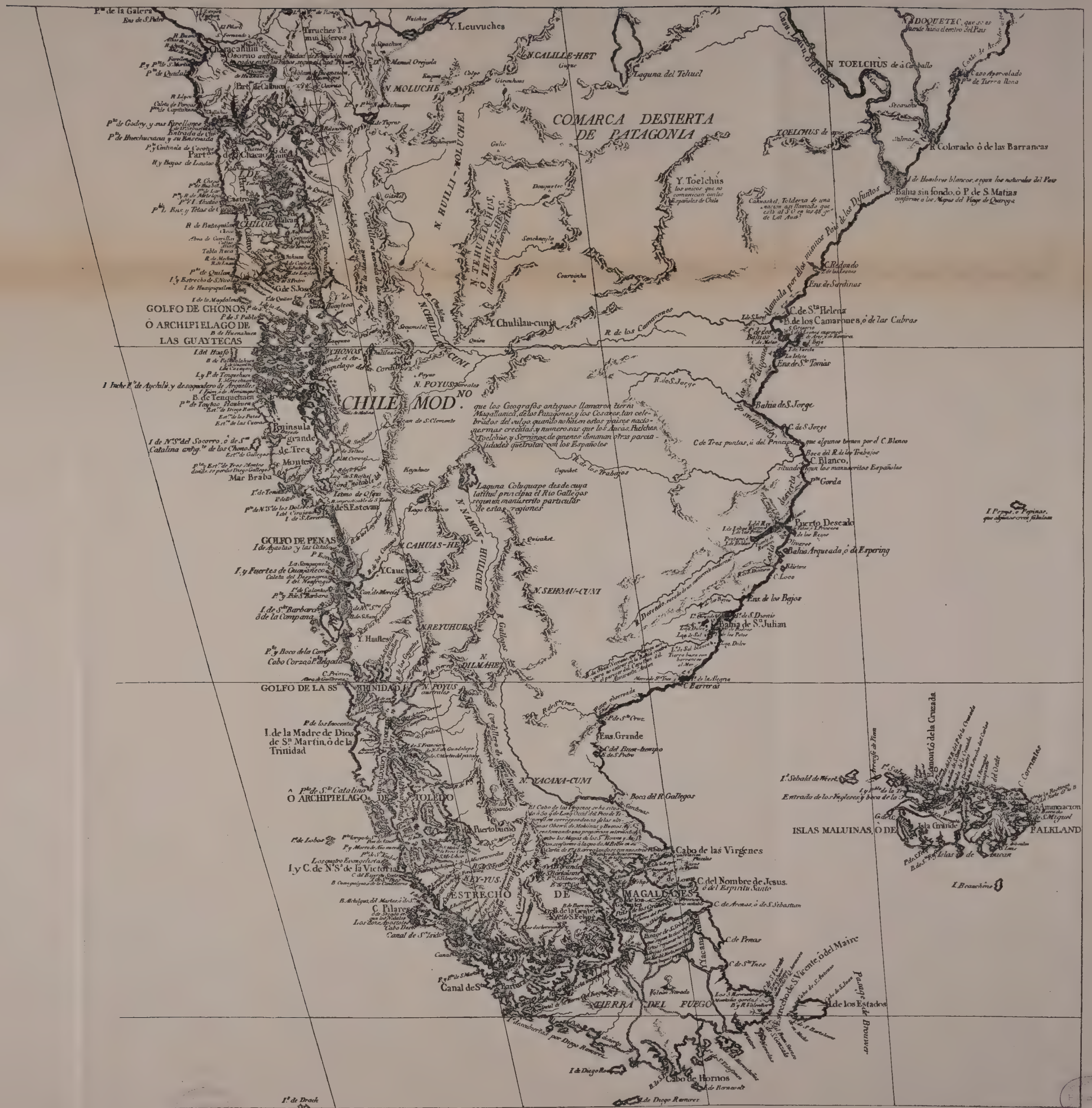
The "Cordillera Nevada de los Andes" is represented as forming a more or less continuous range, with other lateral chains. The Calén inlet is figured as receiving the waters of the Río de los Caucaos Brabos, through which Lake Chelenco flows (this lake can be identified with either of the two now called Soler and Pueyrredon). On the eastern side of the range is Lake Coluguape which corresponds to Lake Buenos Aires, and is represented as flowing to the south. ("Lake Coluguape," it is said in the map, "from the latitude of which begins the Río Gallegos, according to a private manuscript map of those regions").

The map by Olmedilla has been generally the basis of the maps of Patagonia until the voyage of Captain Chaworth Musters published in 1871, but it has no application to the boundary question.* If the maps of more than a century later are examined, errors as great as those contained in Olmedilla's may be observed; amongst others, in the map quoted at page 53, as corrected by Señor Barros Arana.

Recently, owing to the active propaganda on the part of the Chilean geographers in favour of the boundary line in the continental divide, some cartographic publications have modified the traditional boundary, although not always in complete agreement with the Chilean ideas. A few of the principal examples only will be quoted.

The map of the southern extremity of America in Stieler's Hand Atlas, editions of 1881 and 1888, sheet 94, (Plate XIX.) contains the Argentine-Chilean boundary line in accordance with the geographical results of Chilean surveys, and with the Argentine interpretation of the Treaties. The line leaves Lake Lacar in Argentine territory, cuts the rivers Villegas or Puelo, Palena, Aisen and Huemules, and at the southernmost end runs near Last Hope Inlet, similarly to that afterwards proposed by the Argentine Expert. Nevertheless,

* In order to set aside this map it would suffice to quote the following words by Señor Bertrand: "This ancient map (that of Olmedilla), carefully engraved and ornamented with a profusion of heraldic scutcheons and allegories, can only serve now as an historical document. . . . We shall not detain ourselves in a critical discussion of these demarcations, which may only serve to show how irreconcilable with each other the official documents issued by the Spanish Crown used to be. *These documents are, however, those that are sometimes exhumed in order to revive alleged and lapsed rights.*" (*Memoria sobre las Cordilleras del Desierto de Atacama*, etc., pp. 141 and 142.)





shortly after the Chilian Expert started his campaign against the Andean summits boundary, in order to support the continental divide, the new editions of Stieler's Atlas depict Lake Lacar as within Chilian jurisdiction, although the old line is still shown cutting the above mentioned rivers, whose upper courses continue to figure as watering Argentine lands.

Andrée's Hand Atlas, 1899, sheets 178 and 179, shows the Argentine-Chilian boundary along the continental water-parting, evidently as the result of the Chilian Expert's propaganda.

The same influence also is observed in the maps of the Argentine Republic, Uruguay and Paraguay, and in that of Chile, published by F. Volckmar, of Leipzig, 1897. In the first of these the dividing line from near the volcano of Copiapó, follows the Andean crest, but this crest has been delineated in such a manner as to make it pass to the east of Lake Lacar; this notwithstanding the line leaves in Argentine territory a stream that, running from the south, flows into that lake; and the range is depicted once more cut through by a river flowing to the west from a lake situated eastward of the Cordillera at the north of lake Nahuel-Huapi. From this point the line runs along the continental divide, which is figured as occurring in the summit of the range as far as Lake Fontana. To the south of Lake Fontana the line follows by the sources of the rivers Aisen and Huemules, leaving the Cordillera to the west, and south of that river returns to the crest, so continuing until Last Hope Inlet is reached, the shores of which are left to Chile in accordance with the Treaties.

The second map, viz. that of Chile, is more contradictory. The boundary has been traced along the Andean crest, but owing to the faulty information received by its author, the said crest is shown as following the sources of the rivers that discharge into the Atlantic and into the Pacific (always to the south of the volcano Azufre or Copiapó). The main chain of the Cordillera is thus drawn to the east of Lake Lacar, and consequently, the Argentine fort of Maipu is placed in Chilian territory. However, the boundary further south has been drawn from the Tronador to the south of the Puelo river, in the manner proposed by the Argentine Expert, that is to say, cutting Rivers Manso and Puelo; but from this point, the main chain has been carried to the east, and indicating it as lofty snow-capped mountains, it is made to run in such a way that the valley of 16 de Octubre is represented in Chilian territory. Similarly, the plains whence the Rio Palena takes its source have been drawn as peaks crowned by eternal snow, and the same thing has been

done to the south of Lake Fontana, the source of the Aisen appearing to be in high mountains, whilst the fact is that it rises from the swamps of Goichel and the Patagonian table-land.

The cartographer has been led into these geographical errors by defective data, and has delineated a frontier which, although it would appear to be the real one, since it is shown along the mountain tops, is inexact as regards its location. When he had sufficient information available regarding the water-courses which cut through the Cordillera, the boundary has been drawn crossing those watercourses. Thus, besides the two rivers mentioned, the line, when reaching the neighbourhood of Last Hope Inlet, is figured cutting the shore of the latter, and in order to do so it crosses the outflow of Lake Sarmiento, which is the name given in the map to lake Maravilla.

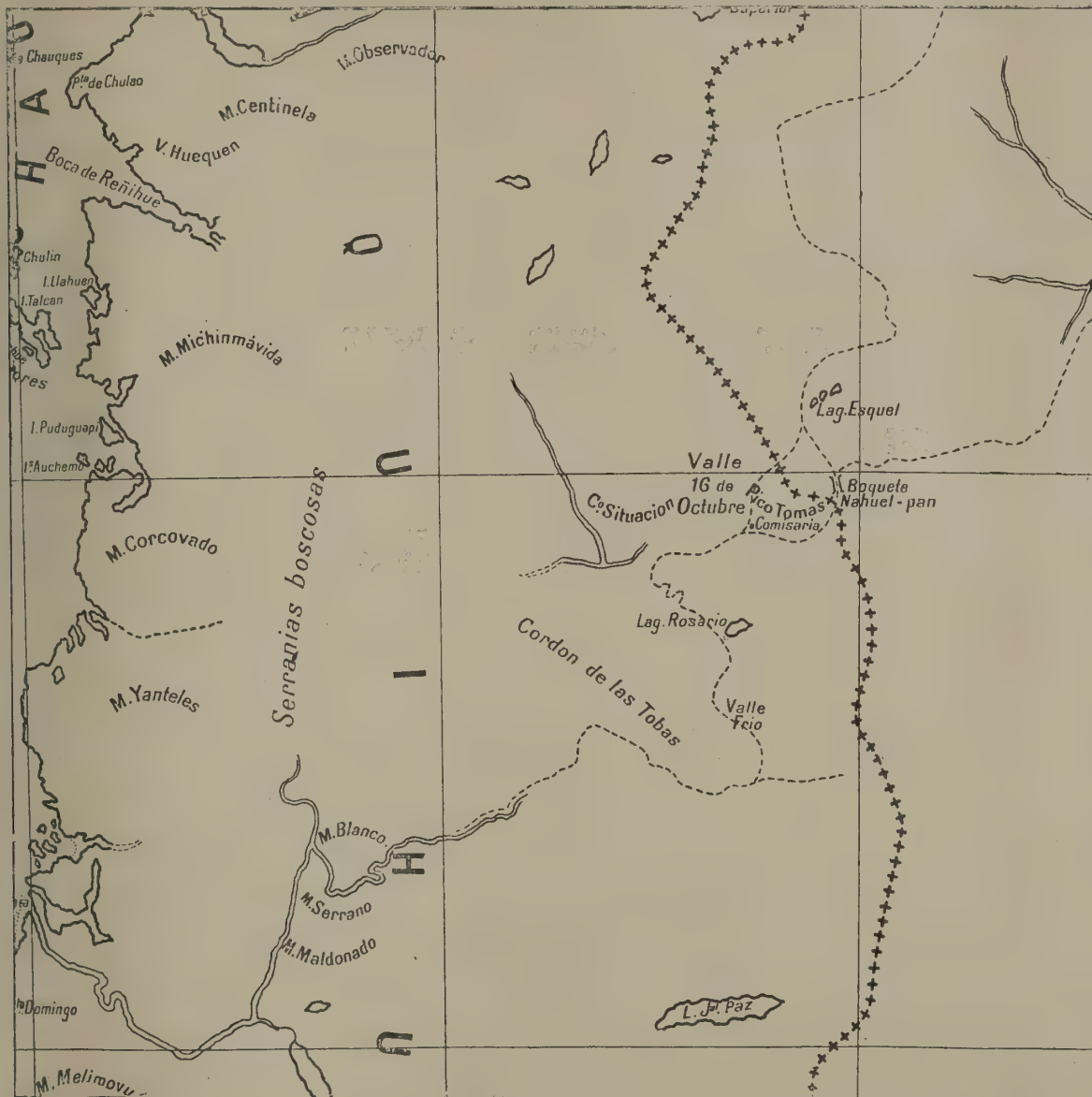
Another map, i.e. Johnston's map of 1898 (Plate XX.) shows the Argentine-Chilian boundary along the crest of the Cordillera de los Andes as far as the volcano of Llullaillaco, from the summit of which the boundary is carried on towards the south, up to the western extremity of a transversal chain. Between this latter point and Cerro Bravo to the west, there is no indication of any line, but from this last named Cerro the line continues to the south. Thus the Puna de Atacama is recognised as Argentine, being indicated as belonging to the provinces of Salta and Catamarca. The line from Cerro Bravo follows along the Cordillera in the *divortium aquarum* as far as the western end of Lake Loloj, where it trends to the east, leaving within Chilian territory the region of Lake Lacar and the Argentine fort Maipu; then, turning to the west, the Andean crest again forms the line as far as the Tronador; thence, continuing southwards, the line cuts not only all the rivers which empty on the western coast, but likewise some of the maritime channels and their islands, such as the channel of Gay and Payuhuapi and Magdalena Island, the inlets of the Aisen, Elefantes and Huemules, and Eyre Sound. It is prolonged as far as parallel 52° along the real Andean crest, in the Cordillera Sarmiento, in such a manner that Last Hope Inlet remains in Argentine territory.

There exist also two Chilian maps that should not pass unnoticed in view of the official character which they possess.

The first, entitled "Mapa de la República de Chile, dibujado para la Geografía descriptiva de la República de Chile, por Enrique Espinoza," represents the boundary line along the crest of the Cordillera, but the continental *divortium aquarum* is made to coincide with it. This educational work, a text-



book for the schools in Chile, has contributed in no small degree to make the Chilean people consider as perfectly correct the ideas of the Expert, to whom they entrusted the tracing of their eastern frontier. The second is the "Mapa de



SECTION OF THE MAP OF CHILE DRAWN BY THE GENERAL DEPARTMENT OF PUBLIC WORKS OF CHILE, 1897.

Chile publicado por la Dirección General de Obras Publicas de Chile, 1897."* Two portions of this official map are here reproduced ; in one the Argentine

* This map has already been quoted, p. 473.

Colony of 16 de Octubre appears in Chilian territory, as well as the "Comisaría" or Police post, the nationality of both being thus altered by the cartographers, whilst in the other the outlet of Lakes Fontana and La Plata into River Senguerr is suppressed, a mountain ridge being there represented, in order to leave those lakes in Chilian territory to the west of the interoceanic water-parting. Lake Buenos Aires however, is recognised as Argentine, and its outflow into the Pacific does not appear.

Travers Twiss has said :—

"Maps, however, are but pictorial representations of supposed territorial limits, the evidence of which must be sought for elsewhere. There may be cases, it is true, where maps may be evidence : when, for instance, it has been specially provided that a particular map, such as Melish's map of North America, shall be the basis of a Convention ; but it is to be regretted that maps of unsurveyed districts should ever have been introduced into diplomatic discussions, where limits conformable to convenient physical outlines, such as headlands or watercourses, are really sought for, and are understood to be the subject of negotiation. The pictorial features of a country, which, in such cases, have been frequently assumed as the basis of the negotiation, have not unusually caused greater embarrassment to both the parties in the subsequent attempt to reconcile them with the natural features, than the original question in dispute, to which they were supposed to have furnished a solution." *

These words, which are strictly applicable to the present question, deprive erroneous private maps of any value, where dealing with the geographical lines proposed by the two Experts. Of what avail are the maps commented upon in this and the previous chapters—the map of Napp, those attributed to Burmeister, and Siemiradzky, the map of Brackebusch, quoted in the Chilian statement in support of the theory maintained by Señor Barrcs Arana, etc.? Further, what force can maps have, for that purpose, which do not bear an official character? These maps have no reliable geographical basis, and neither the Argentine nor the Chilian Government have accepted them as an evidence to define the common boundary. The only ones which bear that character are the official maps published in reference to this question.

* The Oregon question, etc., p. 228.

The Experts having both approved, in August and September 1898, the work done by their respective surveyors in drawing up the general maps, which have been handed over to Her Britannic Majesty's Government, and great



differences existing between the two sets of maps, it becomes necessary, before proceeding further, to briefly analyse the Chilean maps, in which orography is so

erroneously represented that it is impossible to acquire through them an accurate knowledge of the features of the ground, and of the divergences between the Experts.

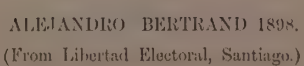
Three maps will be examined; but as Señor Alejandro Bertrand, while technical adviser to the Chilian Expert, must have had a large share in drawing up these maps, it is expedient to say a few words upon a sketch of his journey in Patagonia. This sketch shows the itinerary of his journey, and the continental divide. It does not contain *the slightest mention of the Cordillera de los Andes*. Following from south to north the route traced in the map (Plate XXI.), it will be seen that Señor Bertrand crossed the continental divide west of the bend of the Vizcachas river, continuing to where Lake Argentino empties into the Santa Cruz river, without coming in this part within reach of *even the eastern spurs of the Cordillera*; he proceeded along the eastern side of Lake Viedma, crossed near the former outlet of Lake San Martin (which lake he did not observe), and ascended the Patagonian tableland—partly covered with lava—which he erroneously considered to be *a spur of the Cordillera*, and which obliged him to make a *détour* directly eastward. Passing round lake Quiroga, which he calls lake Obstáculo, he continued in a northerly direction, *gradually getting farther away from the Cordillera, until a distance of thirty or forty miles from its easternmost spurs*. Following by the ancient road of the Tehuelches tribes, he crossed the Rio Fénix west of Pariaiken, and Rio Senguerr, twenty miles east of Fontana lake; he then traversed, thirty miles from the range, the plain in which rise the Rivers Frias and Pico, which, *cutting through the Cordillera*, empty into the Pacific; and continued as far as Lake Nahuel-Huapi, where, for the first time he approached the Cordillera, visiting *the alluvial cones between Lakes Mascardi and Gutierrez, forming the continental water-parting*. During his expedition, Señor Bertrand could not have observed the real watershed of the Cordillera between $46^{\circ} 30'$ and $49^{\circ} 30'$ S. lat., as may be seen in the sketch, which shows that watershed far to the west of his itinerary to the south of Lake Buenos Aires. According to this sketch the *continental divide* is found to the west of Lake San Martin, and it was only after the Argentine Expert had pointed out to his colleague that this lake really drained to the west, and that consequently the *continental divide* was to the *east of it*, that the maps of the Chilian Boundary Commission were altered.

Señor Bertrand's expedition was realised with the purpose of inspecting the Chilian surveys south of 41° S. lat., and he did not visit the Cordillera, since

JERENTE: VÍCTOR BIANCHI TUPPER

*Itinerario
a la cordillera austral
Febrero i Marzo de 1898
técnico de las comisiones
de límites.
D^a ALEJANDRO BERTRAND*

Itineraria.
Divisoria. conti
nental de aguas



the Sub-Commissions inspected by him never worked within the zone where the boundary is to be traced. *With the exception of the Sub-Commission, which was to operate between 41° and 44° S. lat., and which only reconnoitred a small portion of the south-western arm of Nahuel-Huapi, none of the Chilian Sub-Commissions throughout the whole district as far as 52° S. lat. reached even a spur of the eastern slope of the Cordillera.* It was with this deficient information that the Chilian Expert prepared the map which, with some corrections made according to Argentine data, was afterwards presented to Her Britannic Majesty's Government. Plate XXII. shows the two boundary lines, the itinerary of Señor Bertrand's journey, and the zones examined by the Chilian boundary Sub-Commissions, according to official documents.

1. The Chilian Expert must have had little faith in the efficacy or exactness of his own theories, judging by his graphic representations of orography and hydrography in the publication entitled "The Boundary Question between Chile and the Argentine Republic. The existing Treaties. The Records of the Experts. The Records on Arbitration." * This report contains the first map referred to.

According to a notice which is contained in the introductory explanation of this publication, the map, which forms a part of it, "*is intended only to indicate graphically the boundary lines claimed by the Experts, and does not show the administrative divisions, nor the railways, nor the mountain chains, which would only have tended to confusion in the tracing of the lines.*" †

To have marked the Cordillera de los Andes in that map would have been tantamount to recognise its existence, but as the Cordillera has been suppressed by the Chilian Expert in his communications, he also suppressed it in his map, as if by that process it were possible to eliminate its gigantic summits from the surface of the earth. It is, besides, worthy of attention that while the Chilian Expert proclaims his respect for the Treaties, he sets aside, as leading to confusion, precisely that feature along which, according to those Treaties, the boundary must be marked out.

It is only in the region of the high plateau of Atacama that he has marked chains of mountains. But, if he has considered it unnecessary to depict the Cordillera as the only traditional boundary between the two countries, *on the other hand he says that he has taken great care to draw the rivers with prolixity.*

Let us in the first place examine whether in the region of Atacama the chains

* La Cuestion de Límites entre Chile y la República Argentina por Diego Barros Arana, Santiago, 1898.

† Ibid., page vi.

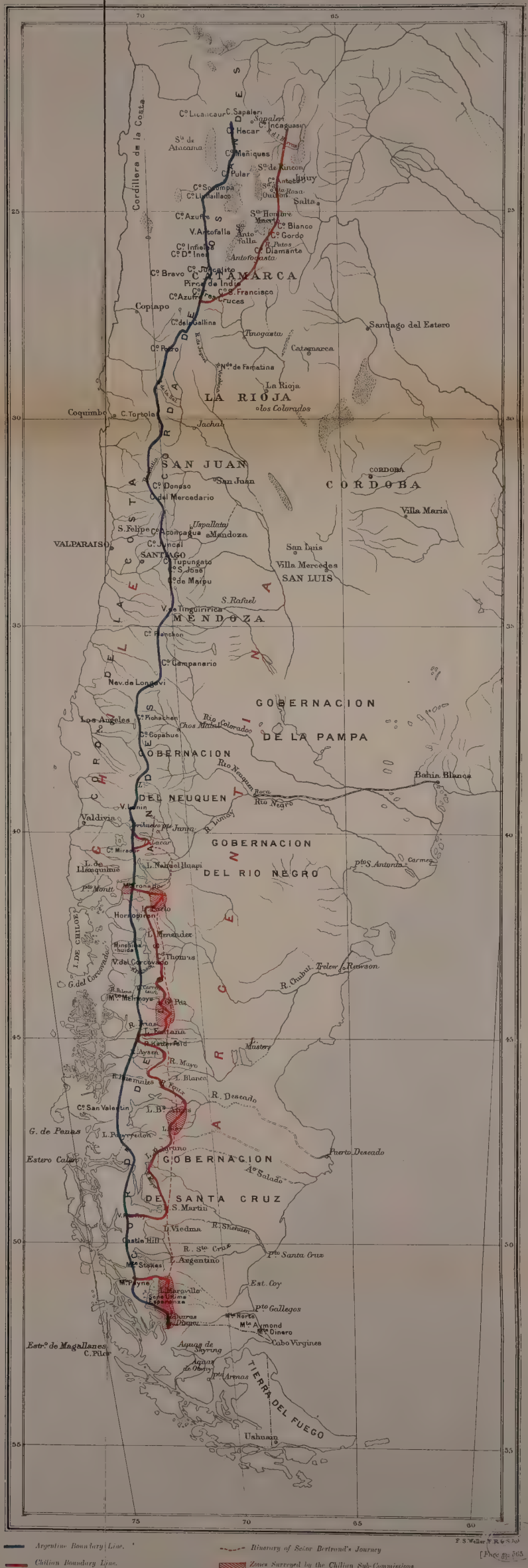
of mountains have been properly traced, and if in marking the rivers there is really the alleged prolixity. The Argentine line, in this region, is traced with some precision, following the crest of the Cordillera de los Andes which exist there, and which Señor Barros Arana does not dispute ;* but the contrary is the case with the Chilian line. In fact, this line which the Chilian Expert described in the Record of September 3, 1898, as intersecting the rivers Burras, or Susques, and Patos, *is shown in Señor Barros Arana's map in such a way that those intersections do not appear.*

In the case of the River Susques or las Burras, in the map the river disappears to the west of the mountain chain at the village of Susques, and by these means the line proposed by Señor Barros Arana, in the said Record (September 3, 1898), which passes at about ten kilometres (6·21 miles) from Susques, is depicted as not intersected : *the eastern part of the river Susques has been omitted in the map.* Is this the remarkable prolixity in the tracing of rivers?

In the second case, it is not the Rio de los Patos which disappears : it is in the chains of mountains that the modification has been made. *In the map, the part of the chain which runs between the Cerro Gordo and Vicuñorco has been altered, leaving out the Cerro Aguas Calientes, and the snow-capped peak of Diamante, or Mecara.* If the orography is traced, as Señor Barros Arana traces it in his map, the Rio de los Patos *does not intersect* the crest of the chain, that is to say, the line of the water-parting, which, according to him, is supposed to separate Chile from the Argentine Republic.

South of parallel 27° S. lat. the hydrography is generally accurate as far as 41°, and since with the exception of the differences that arose as to lake Lacar, the boundary line in this region has been definitely settled, it is unnecessary to make further reference to that part of the map. To the south of 41° some errors quoted from the sketch of Señor Bertrand have been corrected in accordance with the information furnished by the Argentine Expert ; the Argentine Lakes Viedma and San Martin have been merely copied from the plan published by Señor Moreno in 1879 ; the indication of the outlet of Lake San Martin towards the west has been simply added by means of an arrow, and the River Mayer, discovered in 1897 by Mr. Hatcher of Princeton University, is indicated in the same way ; neither Lakes Nansen, Azara, Belgrano nor Brown appear ; Lake Pueyrredon is barely indicated, and this rough indication has been only made

* Note of January 18, 1892, to the Expert, Señor Pico. Record of September 3, 1898.



DIAGRAMMATIC SKETCH SHOWING THE PROPOSED ARGENTINE AND CHILIAN LINES, THE ITINERARY OF SEÑOR BERTRAND'S JOURNEY, AND THE ZONES SURVEYED BY THE CHILIAN BOUNDARY SUB-COMMISSIONS TILL 1898, ACCORDING TO OFFICIAL DOCUMENTS.

at the suggestion of the Argentine surveyors who explored it. The region comprised between the southern part of the eastern slope of the Cordillera from Lake Buenos Aires ($46^{\circ} 40'$ S. lat.) to the Volcano Lanin ($39^{\circ} 30'$ S. lat.) has been copied exactly from the plan of the same region published in 1896 by Señor Moreno.*

2. In support of this map, which is reproduced in facsimile in Plate XXIII., another was published after the resignation of Señor Barros Arana as Chilean Expert, in the pamphlet entitled "Demarcation of the boundary between Chile and the Argentine Republic: existing Treaties and Protocols and official Records and communications concerning the general boundary line, Santiago de Chile 1898."† The map on the scale of 1 : 2,500,000 is divided in two parts, the first of which comprises the "Chilian line" (*divortium aquarum*) and the "Argentine line" from parallel 23° to parallel 37° , and the second comprises the same lines up to parallel 52° S. lat. Some indications of mountains are shown in this map, which may rather be considered as a diagram, since it is very far from giving even an approximate idea of the orography of the country: the Cordillera de la Costa, for instance, has been suppressed, and therefore the central longitudinal valley of Chile cannot be distinguished.

The map has either been made without the necessary data, or it answers to preconceived and erroneous ideas: several mountains are placed out of their true geographical situation, as if to harmonise with the theories of the continental *divortium aquarum*, in opposition to the true boundary line in the main chain of the Cordillera de los Andes, which has been suppressed in the map as a range. However this may be, it depicts mountains, and among others the "Cordillera Real," which, though *represented without any name, appears intersected by the Rivers Burras and Patos*, as it is in fact.

This publication has been laid before the Arbitrator by the Chilean Representative at the same time as "*a map of the country extending from 22° S. lat. to 52° S. lat. on a scale of 1 : 1,010,592.*‡ If a comparison be made, it will be seen that *these two official maps do not correspond with each other*, with regard to the line between the Cerro Gordo and that of Vicuñaorco. The one inserted in the pamphlet agrees with the Record of September 3, 1898, as it traces a straight

* Apuntes preliminares, La Plata, 1897.

† Demarcación de límites entre Chile y la República Argentina, Santiago de Chile, 1898.

‡ These are the words used to describe this map in the Minutes of Proceedings of the Tribunal, First Meeting, March 27, 1899.

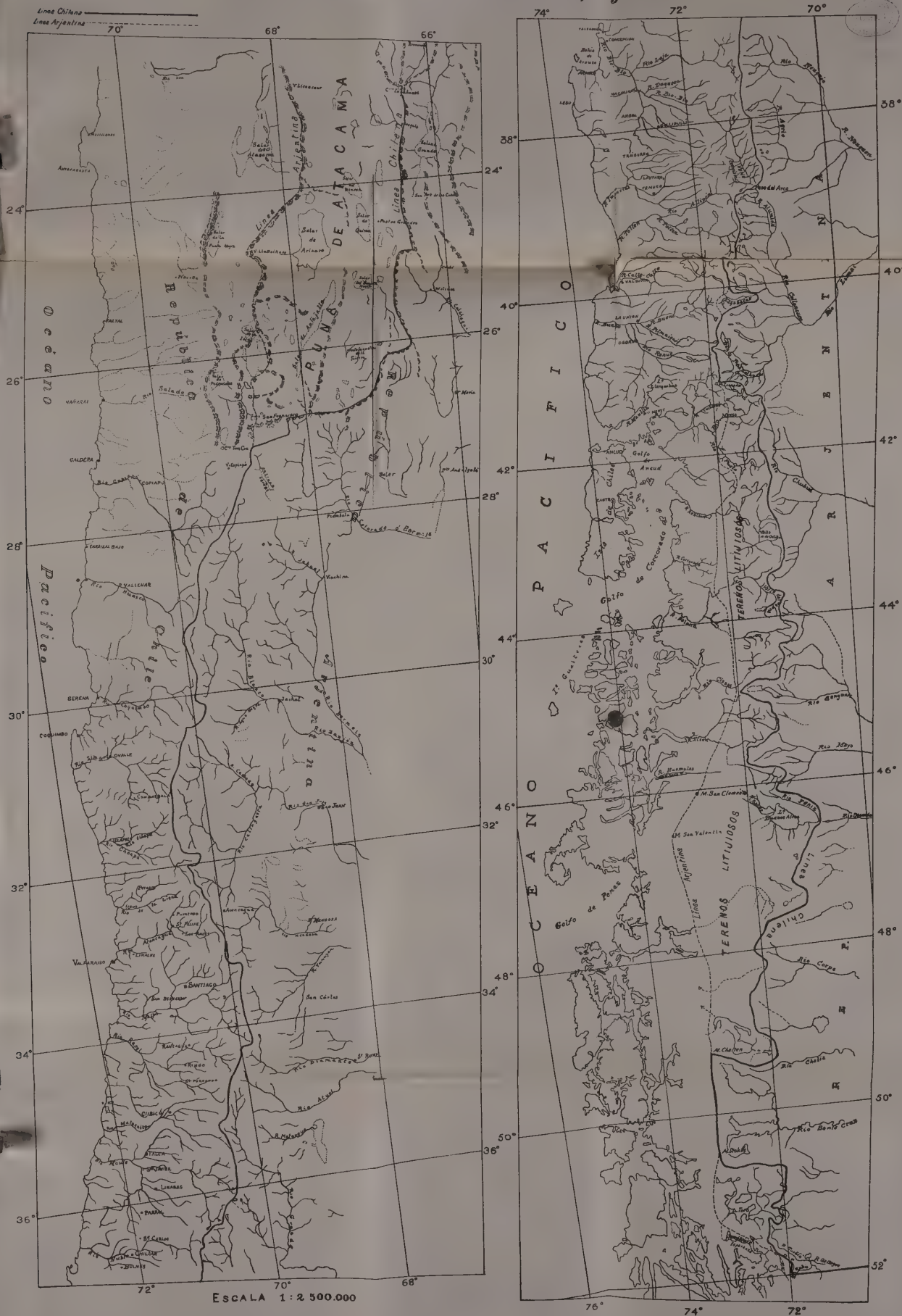
line from north to south, between Cerro Gordo and Vicuñaorco, intersecting the River Patos, and passing by Cerro Aguas Calientes and the peak of Mecara ; whereas, in the second, on a scale of 1 : 1,010,592, the line deviates, as in the map of Señor Barros Arana, so as to make it run over the eastern ridge enclosing the whole basin of the River Patos, and without taking into consideration Cerro Aguas Calientes and the snow-capped peak of Diamante or Mecara. This map, therefore, is not in accordance with the Record of September 3, 1898. The attention of the Tribunal is called to this point.

As the map inserted in the pamphlet in the portion relating to the region north of 27° will be reproduced in the next chapter, there is only given here the facsimile of the second sheet, comprising the zone south of 37° up to 52° (Plate XXIV.). If this sheet be compared with the corresponding part of the first map, it will be seen that the only alterations made in it are that a mountain is shown between Lakes Mascardi and Gutierrez south of Nahuel-Huapi *where, in reality there only exist swamps in alluvial cones* ; that the Lake La Plata, which was exaggerated in the Argentine plan, has been reduced in size, and that the outlet of Lake Buenos Aires has been changed and directed through another extensive lake towards the north-west arm of Calen inlet. Furthermore, the Chilian Boundary Commission has given the name of Lake Cochrane to the Argentine lake Pueyrredon, and altered the direction of the outlet of Lake San Martin. This map, besides, wherever it is a question of the orography of the region east of the Cordillera, is of Argentine origin except as to the errors that it contains. As regards the *Cordillera de los Andes* itself it has not been depicted, although great care has been taken to give the name of Cordillera to hills of very small importance, as those of Tepuel.

The Chilian official map presented to Her Britannic Majesty's Government on a scale of 1 : 1,010,592, contains an erroneous sketch of the mountains as the only additional feature. In all these documents, the Serrano river, an outlet of the lacustrine system between Lake Argentino and Last Hope Inlet, appears as encircling the mountain group culminating in the Balmaceda ridge on the west, which is incorrect.

In the said official plan the outlines of Lakes Argentino, Viedma, and San Martin have also been copied from the old Argentine plans of 1879, nor has the region between Lake San Martin and the Lanin Volcano been corrected ; the same imperfections pointed out in the former plans have been retained in this map, which while it has been presented as the Chilian Boundary Commission

Plano de las líneas limitrofes de Chile i Rep. Argentina.



Handwritten musical notation on a single staff, featuring various notes, rests, and bar lines.

Handwritten text at the bottom right corner, possibly a signature or page number.

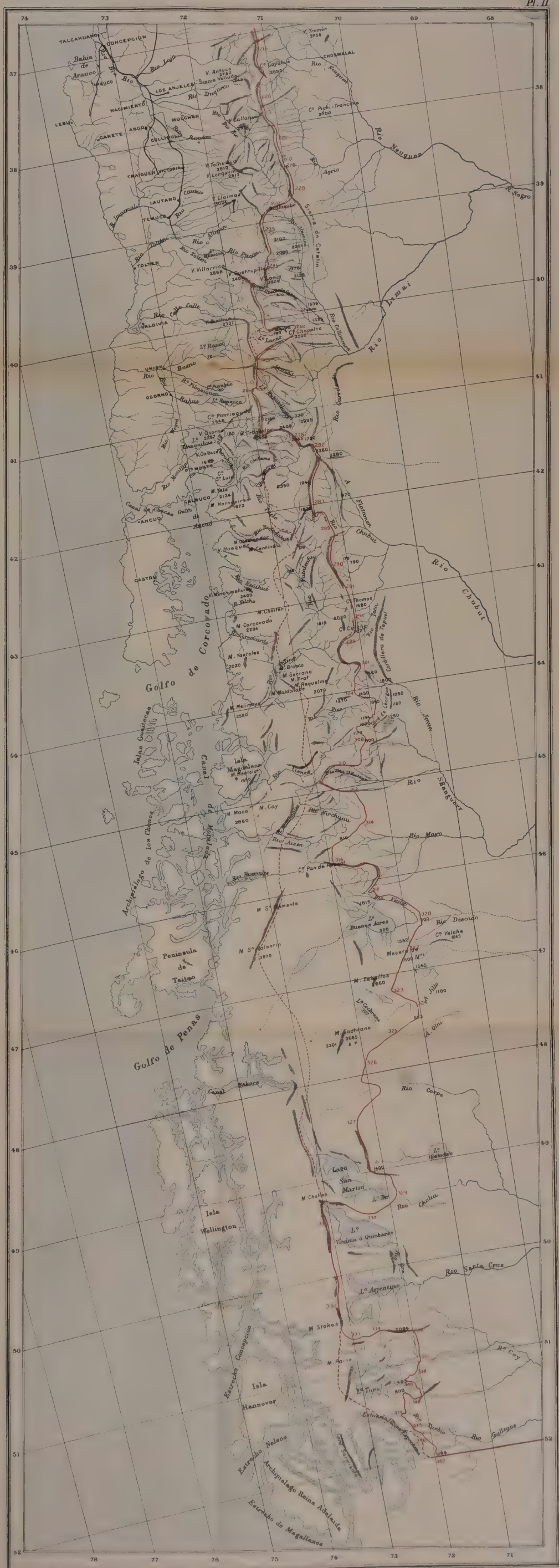
DEMARCAACION DE LÍMITES ENTRE CHILE I LA REPÚBLICA ARGENTINA

Escala de 1/ 2,500,000

LINEA CHILENA (*divortium aquarum*)

LINEA ARGENTINA

Pl. II



Map to illustrate the questions submitted to arbitration, is, as regards the eastern slope of the Andes in the neighbouring region, nearly an imperfect copy of the Argentine maps drawn previous to 1897, with the addition of the bare mention of the lakes named Obstáculo and Cochrane.

Such being the plans, the statement of the Chilean Expert in the Record of August 29 is easily understood:—"THE TOPOGRAPHICAL LOCATION OF THE PROPOSED LINE IS WHOLLY INDEPENDENT OF THE EXACTNESS OF THE MAPS." If the Chilean Expert had depicted the *correct topography of the southern zone of the Cordillera de los Andes*, he would have condemned his own pretensions. His topographers hardly visited even a minimum portion of the region which they were to survey, and in some cases, as happened in the vicinity of Lake Buenos Aires, they did not succeed in catching a glimpse of the high summits of the Andes, which, according to Señor Bertrand, *separate Chile from the Argentine Republic*.*

The differences existing between the two general maps which contain, the one the line proposed by the Argentine Expert, and the other the line proposed by the Chilean Expert, are necessarily derived from the incorrectness of the latter, and from the way in which it has been prepared.

3. The other map which should be mentioned, is that published by Dr. Juan Steffen in his "Informe sumario acerca del Trascurso y Resultados Generales de la Expedicion Exploradora del Rio Cisnes (en la Patagonia occidental), Santiago 1898," which, according to Dr. Steffen's own words, is taken from the general chart of the Chilean Boundary Commission, with some additions in order to make it serve as a cartographic illustration of the said Report (p. 3).

It suffices to examine the facsimile of this map (Plate XXV.) to see that it does not contain more details of the hydrography, but, on the other hand, the orography is more fully represented than in the two former maps. Unfortunately this orography is entirely incorrect. Although no trace is to be found in the map of the Cordillera de los Andes (probably in order not to fall into more serious contradictions than those already noted), a bold sketch is made of the humble ridge of Tepuel, upon which the title of "Cordillera" is bestowed, and there still appear mountains where the plains of Epuyen and Cholila exist in reality, although there are depicted as of smaller importance the

* Estudio Técnico, p, 18.

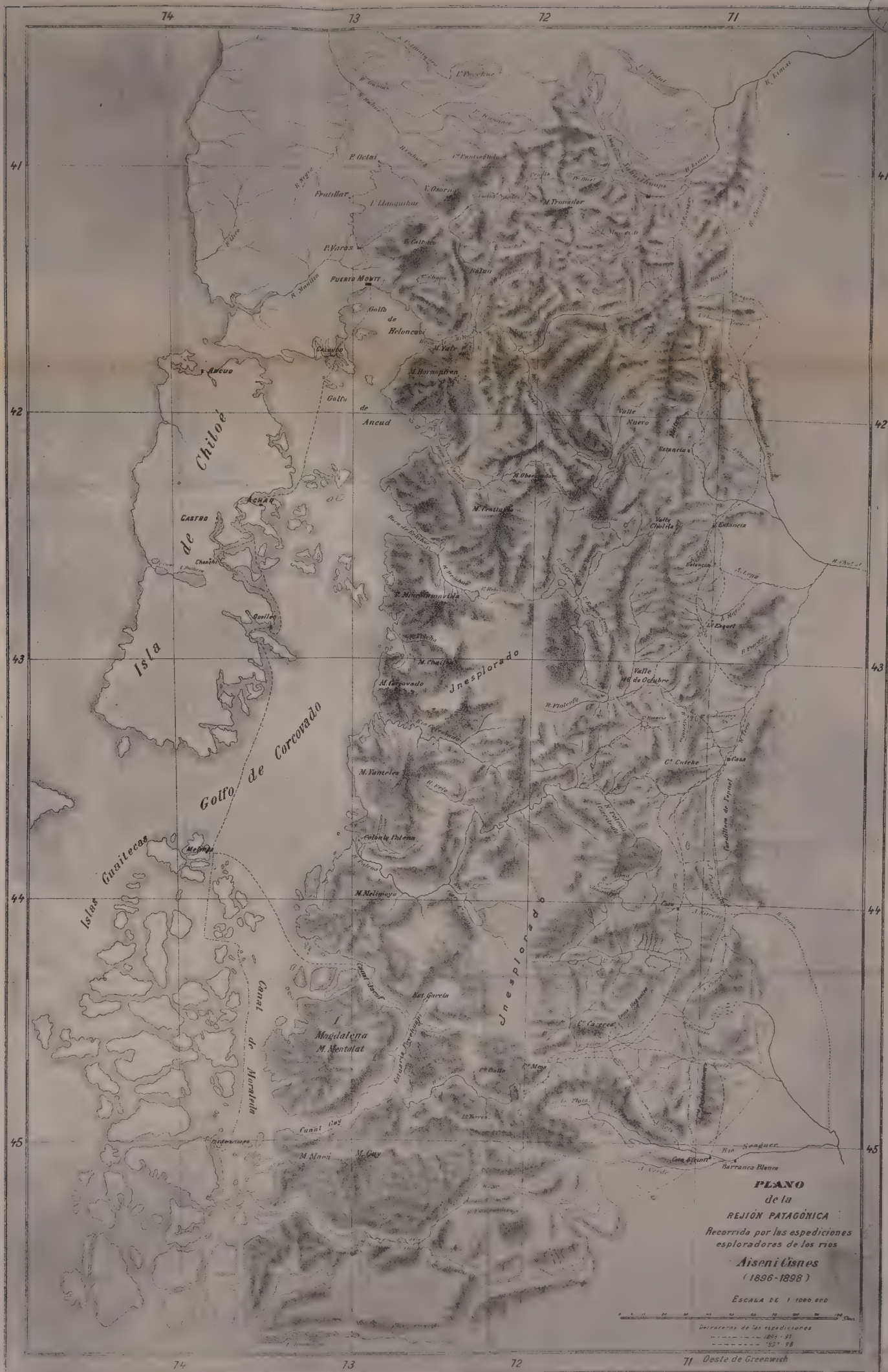
orographic features which, in the already quoted maps of Señores Fischer (p. 542, Plate XV.) and Steffen (p. 543, Plate XVI.), are represented to the east of the river Carren-leufu. As regards the upper course of the river Aisen, it is shown as in the sketch referred to at pgea 550, Plate XVII., i.e. wholly in the plain, as it really is. The chief deficiency of this plan consists in the suppression of all centres of population under Argentine jurisdiction, situated to the west of the continental divide and to the east of the Cordillera—some of which figure in the plan of Mr. Fischer and in the previous one of Dr. Steffen himself—whilst the whole of the inhabited places lying to the east of the continental divide are indicated. The Argentine settlements of Valle Nuevo and 16 de Octubre have been omitted, but it has been thought proper to indicate the existence of the insignificant Chilian post of Palena, on the coast of the Pacific.

Lastly, in this map there is no graphical or numerical indication of heights, and for this reason the snow-capped mountains and the slight undulations of the ground appear equally depicted, thus causing a complete confusion on the region there represented.

The three maps which have been examined afford one more proof that the Chilian Boundary Commission has viewed the examination of the ground as prejudicial to its purposes, as otherwise it would have been more careful in this matter. Perhaps the efforts of the Chilian Representative to restrict the Arbitration to the resolution of a theoretical principle, may be attributed to the same motive, for which the knowledge of the ground would have been unnecessary, either by the parties or by the Arbitrator, thus leaving in a secondary place the true questions submitted.

10. CONFUSION PRODUCED IN CHILE OWING TO THE LACK OF GEOGRAPHICAL DATA.

The contradictions between Chilian descriptions and maps have been shown, as well as those existing between the Chilian Expert and the surveyors under his order, between the surveyors themselves and between the different reports of the same surveyor. Based on this long array of contradictions, Señor Barros Arana projected his line, erroneously interpreting the Treaties and defending



a geographical formula that does not stand the slightest analysis, but by which it is attempted to entirely change the immutable facts of Nature.

The data thus gathered were so entangled that they produced in Chile a notable confusion. At the time when the question of boundaries was being hotly discussed in the two countries, in 1892, when the Chilian Expert was displaying the greatest activity in defence of the principle of the absolute water-parting against that claimed by the Argentine Expert—the boundary in the crest of the Cordillera—Chile believed that the water-parting referred to was that of the Cordillera de los Andes occurring along the crest, and that the direction of the waters when flowing down from that crest distinguished the Chilian from the Argentine jurisdiction. Geographical authorities* were invoked in support of these views:—

“A celebrated French geologist and geographer, Mr. Rozet, who enjoyed a great reputation in those times, had explained this fact in the following manner: ‘The flanks or sides of a chain of mountains are given the names of slopes (*vertientes*), because they pour (*vierten*) the waters into the plains. The summit of the chain is formed by the *ensemble* of crests, summits and line of division of the waters upon the mountains forming it. The summit determines the division of the waters which run down the two opposite slopes. This is its characteristic feature, and which must serve to establish it (the division) in every case.’

“This geographical principle is contained, not only in highly scientific books, but in elementary treatises. We have before us Fabrê’s ‘Elements of Geography,’ an excellent book of secondary teaching, and we find therein the same rule laid down in a still clearer manner.

“‘From the dual flanks of a chain of mountains,’ it states, ‘run the streams derived from the gradual melting of the snow and from the continuous condensation of vapour; some descend on this side, and others on the opposite side. From this comes the name of slopes, given to the flanks of the chain. As to the ridge or summit of this chain, it forms the division-line between these two currents in an inverse direction, and constitutes the separation line of the waters.’”

The waters to which these authorities referred were those of the Cordillera. The “*vertientes que se desprenden á un lado y el otro*” were for Chile, the “*slopes which descend one side and the other.*” No one ever meant to consider as the western slopes of the Cordillera de los Andes the whole territory as far as the

* La linea divisoria con la Argentina in “El Heraldo” of Valparaiso, March 4, 1892. This publication is only mentioned on account of the quotations that it contains: reference is not made to the opinion of a newspaper as such.

shores of the Pacific, and as the eastern that extending as far as the Atlantic, inasmuch as everybody knew that the cities of Santiago, Curicó, Talca and Chillan, were situated at the foot of the western "vertiente" of the Cordillera; in the same manner as the villages of Calingasta and Uspallata were on the eastern side.

Another proof that this was the true meaning of the word "vertientes" in the Treaty of 1881, accepted by Chilian geographers at the time when the difficulties were solved by the Protocol of 1893, is to be found in an Article published in the number for January 1894 of the *Anales de la Universidad de Chile*,* of which University the Chilian Expert was rector:—

"Natural barriers are geographical links. In the Pyrenees and in the Alps the French geometers have fraternised with those of Spain, Switzerland and Italy seeking for the concordance of their geodetic elements.

"The length of 4000 kilometres of our Argentine frontier connects so closely the geography of that Republic with ours, that we must regard as our own, every progress of the neighbouring country in that matter.

"It must be confessed, however, that up to the present time, results have not been reciprocal; and that while the silhouette of Chile is an indispensable appendix to every Argentine map, here it is scarcely known the Andes have *vertiente oriental* (eastern slope), and it is easier to obtain in our booksellers' shops a good map of Russia, and even of Central Africa or of China, than one of the neighbouring Republic. This fact is the natural result of two circumstances that it is well to remember: (1) The peculiar configuration of our territory, its prolongation from north to south, and its narrowness from east to west, makes it possible to have it on the side of every Argentine map without the necessity of giving to this larger extension;"

The word "vertientes" is used in that article as meaning "slope" or "versant," and if the Article in the 'Anales' mentions the eastern "vertiente" of the Andes, a western "vertiente" must also exist; these are the two "vertientes," slopes or versants, that descend one side and the other in which line of intersection the boundary shall be marked out according to Article 1 of the Treaty of 1881.

It is also well to mention that in 1893 the words "main chain of the Andes" were interpreted by Chile in accordance with the true and only signification

* Vol. LXXXV., p. 381. The Article is entitled thus: "Geografia Argentina. Nuevo Mapa de la República Argentina, por el Doctor don Luis Brackebusch."

given to them by the Chilian and Argentine negotiators of the Protocol of that year. In fact, in December 1893, i.e. at the time when the Chilian Government ratified the Protocol, notwithstanding Señor Bertrand's opinions in his note of November of the same year, the "Anales de la Universidad de Chile" reproduced Dr. Siemiradzky's Report of his exploration in the Argentine Andean region of Neuquen. This Report, to which reference has already been made, had been published in Petermann's Mitteilungen, in January 1893, that is, before the framing of the Protocol of May 1 of that year, which stipulated, following the true principles of geography, that the boundary line must run along the crest of the main chain of the Cordillera de los Andes.

The Chilian Expert who, during the negotiations for the Protocol, resisted the clause relating to the crossing of rivers, attempted afterwards to modify, in the Record of January 1, 1894, the meaning of the words "main chain of the Andes"; but that there was a time when he accepted this meaning and that clause, is shown by the insertion, in a periodical published under his direction and which is the organ of the chief scientific body of Chile, of the following words by Dr. Siemiradzky, whose competence in the matter has been recognised both by the Chilian Expert and by the Representative of Chile. Dr. Siemiradzky said :—

"In Patagonia the Cordillera is low, and particularly the passes of the Cordillera are very low, since the water-parting is in most cases situated outside the main Cordillera, in Argentine territory."

This opinion, so confirmatory of the Argentine claims, was not contradicted by the Editor of the periodical, in which the report quoted was carefully commented upon in footnotes.

The propaganda in Chile against the true geographical value of the wording of the Treaties and the unacquaintance with the features of the ground, owing to the lack of careful surveys, have been so great that the actual extent of the Chilian Expert's claims are scarcely known even now, and the general opinion favours his contention, on the erroneous assumption that the main chain as defined by him corresponds to the real main chain of the range. The systematic opposition to acquiring a knowledge of the ground has perpetuated these erroneous ideas, and may be considered as the principal reason of the boundary question not being settled directly between the representatives of the two peoples.

That opposition also justifies the judicious agreement of the Argentine and Chilian Governments in 1896 and 1898, that the differences between the Experts when locating the landmarks in the Cordillera de los Andes should be decided by the Arbitrator after a survey of the ground by her own surveyors. Only by accurate maps can these differences be solved. The true geographical features of the Cordillera de los Andes will be made known by that survey; Chile will recognise at last that she has been led into error; and the boundary line will then be traced in a manner satisfactory to the two countries, and in accordance with the Treaties which consult all interests—geographical, political and economical.

CHAPTER XVII.

- Summary*—1. STARTING POINT OF THE DIFFERENCES SUBMITTED TO ARBITRATION. PIRCA DE INDIOS AND SAN FRANCISCO LANDMARKS.
2. DEMARCATION IN THE NORTH. DIVERSE CHAINS OF MOUNTAINS.
3. THE CORDILLERA DE LOS ANDES ON THE NORTH, AS DESCRIBED BY THE CHILIAN GEOGRAPHERS SEÑORES BARROS ARANA, BERTRAND, SAN ROMAN AND MUÑOZ.
4. THE CORDILLERA DE LOS ANDES ON THE NORTH, ACCORDING TO SEVERAL AUTHORITIES.
5. PROJECTS OF THE EXPERTS RELATING TO THE BOUNDARY LINE FROM 23° TO $26^{\circ} 52' 45''$ S. LAT.
6. THE CHAIN POINTED OUT BY THE CHILIAN EXPERT FROM 23° TO $26^{\circ} 52' 45''$ S. LAT. IS INTERSECTED BY RIVERS.
7. THE DEFINITIVE MARKING OUT OF THE BOUNDARY LINE FROM 23° TO $26^{\circ} 52' 45''$ S. LAT.
8. FURTHER CONSIDERATIONS ON THE SAN FRANCISCO LANDMARK.

1. STARTING POINT OF THE DIFFERENCES SUBMITTED TO ARBITRATION. PIRCA DE INDIOS AND SAN FRANCISCO LANDMARKS.

THE Argentine Republic and Chile are conterminous from the parallel 23° S. lat. in a southward direction ; but the boundary between this parallel and $26^{\circ} 52' 45''$ S. lat. has already been settled in the manner which will be explained further on. The divergences which Her Britannic Majesty's Government is called upon to decide begin, therefore, in parallel $26^{\circ} 52' 45''$, where the Chilian Expert projected to plant the first landmark in San Francisco Pass, whilst his Argentine colleague considered Pirca de Indios as being in that latitude the starting point for the delimitation.

In the Records of August and September, 1898, which have been already examined (pages 359 and following) both Experts expressed their general views and determined the points and stretches along which, in their opinion, the boundary line should run.

The Chilian Expert proposed that the frontier line should proceed by San

Francisco Pass, Mount San Francisco, Incahuasi Pass, Mount Incahuasi, Las Lozas Pass, Mount del Fraile, Mount del Muerto, snow-capped peak Ojos del Salado, marked with Nos. 1 to 8 of his list ; and he added that this line separates the Chilian slopes belonging to the basin of the River Salado de Chañaral, from the Argentine basin of River Colorado or Bermejo de la Rioja, and that the points named Mount Solo, Mount Tres Cruces, Mount Puntagudo, Los Patos Pass, Mount Los Patos, Tres Quebradas Pass, Gap of Valle Ancho, and Mount Dos Hermanas, marked with Nos. 9 to 16, separate the basin of River Salado de Chañaral from the Argentine basin of Jagüel.

The Argentine Expert said on his part that, according to the Treaties, the frontier point of the main range of the *Cordillera de los Andes*, adjoining parallel $26^{\circ} 52' 45''$ was that of Pirca de Indios (No. 1), wherefrom the boundary should be continued along Mount Cenizo (No. 2) and Mount Tres Cruces (No. 3).

The Experts not having agreed to this first part of the line, the question has been submitted to the decision of Her Britannic Majesty's Government, for the tracing of the frontier line from parallel $26^{\circ} 52' 45''$ to the summit of Cerro de Tres Cruces, a point of the frontier upon which both Experts have agreed. If it were considered that Pirca de Indios is a point belonging to the main chain of the Andes, the Argentine line should be adopted as the only one possible as far as Mount Tres Cruces. If, on the contrary, the isolated volcano San Francisco were considered as belonging to that main chain, it would then be necessary to unite Mounts San Francisco with Tres Cruces. The question in this section consists, therefore, in inquiring which of the two places, Pirca de Indios or San Francisco, is situated in the main chain of the Cordillera de los Andes.

In the preceding chapters* it has been stated that the erroneous planting of a provisional landmark at San Francisco Pass was the origin of protracted discussions and of several clauses in the Agreements ; that the Protocol of 1893 ordered a revision to be made of what had been done, and in the event of errors being found, the landmark should be transferred to the point in which it should have been fixed according to the terms of the Boundary Treaty ; that consequently a new survey of the ground was agreed between the Experts, and the respective instructions to their assistants were imparted on January 1, 1894 ; that notwithstanding this, the Chilian Sub-Commission did not comply with the mission entrusted to it, and argued that its only task was confined to inquiring

* See pp. 260, 264, 315 and following, 327, 332 and following, etc.

whether the provisional landmark had been really planted at San Francisco gap—a fact which no one had ever doubted ; that after the survey was performed by the Argentine party, the Expert Señor Quirno Costa proposed the landmark to be transferred to the pass of Santa Rosa in the chain of Maricunga ; that the Chilian Expert answered on that occasion that he deemed necessary a fresh examination of the ground in order to be in a position to consider his colleague's indication ; that, during the negotiations which preceded the Agreement of 1896, the Chilian functionaries presented several drafts of compromise recognising the Argentine dominion over the Puna de Atacama, and all considered as an unavoidable consequence of this recognition the removal of the San Francisco landmark, which they proposed to transfer to Mount Tres Cruces ; and, finally, that the Agreement of 1896 stated :—

“Both Governments agree that the present location of the San Francisco boundary mark between parallels 26° and 27° S., shall not be considered as a basis or a binding antecedent for determining the delimitation of that region, the operations and the work therein effected at different times to be regarded as examinations for the definite fixing of the line, without debarring the Experts from realising others that they may think fit to direct.”

The attention of the Tribunal is called to this stipulation, which renders useless any argumentative effort based on the error committed when planting in San Francisco the provisional landmark. The true and only question pending, which must be examined from a geographical point of view is, therefore, as already stated, whether Pirca de Indios gap or San Francisco gap is situated in the main chain of the Andes.

During the working season of 1896 and 1897 the investigations ordered in the Agreement of April 17, 1896, were commenced. The Chilian Expert had thought it advisable, before proceeding to the actual delimitation, to obtain some knowledge of the ground, thus changing his former views, which were always contrary to those previous explorations so persistently proposed by all Argentine Experts. The necessity of these surveys having been recognised as a part of the demarcation work, the Argentine Expert agreed with Señor Barros Arana, and consequently the necessary Instructions were given.*

The Argentine Sub-Commission began its labours at 23° S. lat., in accordance with the procedure adopted, continuing them southwards to 25° ,

* February 17, 1897, quoted on p. 336.

while the Chilian Sub-Commission devoted itself to examining the basin of Pedernales, south of 26° S. lat. as far as the immediate neighbourhood of the Cerro San Francisco, probably in order to be able to supply Señor Barros Arana with the data necessary to him for his reply to the proposal of Señor Quirno Costa that the landmark planted in the Portezuelo de San Francisco should be transferred to the Portezuelo de Santa Rosa.

In the meantime, the Agreement having been arrived at on May 1, 1897, on the proposal of the Argentine Expert, to prepare and discuss, at the end of next season, that is to say, in 1898, a general line for the whole frontier, the explorations were made, in the extent that each of the Experts considered it necessary, and they were carried out so thoroughly on the part of the Argentine Sub-Commissions, as directed by their chief, that they traversed the entire region of the boundary.

The 6th Sub-Commission was entrusted with the section between 23° and 27° S. lat., and in examining the whole of this region, they crossed it in different directions, making a preliminary map sufficiently clear to enable the Argentine Expert to draw the general frontier line in that section *in the Cordillera de los Andes*. The Chilian Sub-Commission restricted itself to examining the section between Santa Rosa and San Francisco and the Mounts Antofalla and Azufre or Lastarria, between 25° and 27° S. lat.

The Argentine Expert, when laying before his Government the antecedents relating to the divergences which had arisen, showed that among the points proposed for the dividing line by his colleague, which, in his opinion, were not situated in the *Cordillera de los Andes*, are those numbered 1 to 9 in the Chilian list, that is to say, from the San Francisco Pass to Cerro Solo.

When the Chilian Government was acquainted with this information, the Chilian Minister for Foreign Affairs stated to the Argentine Minister Plenipotentiary, that according to the communication received from the Expert, Señor Barros Arana, those points were situated in the Cordillera de los Andes ; whereupon the Argentine Minister agreed on behalf of his Government to submit this divergence to Arbitration. The questions then to be resolved refer to the disputed points situated in the Cordillera de los Andes, and in its principal chain, as stipulated for in the Treaties referred to.

When the Argentine Expert asserted that the Pass of San Francisco was not strictly within the Cordillera de los Andes, he did so after surveys of the ground in the zone lying to the north-west of the Argentine territory.

The trend of the principal chains and cordons which form the mountainous region of that part of South America will be pointed out, and it will be demonstrated upon undeniable authority, supported by personal observation, that the orographical features on the east of the mass of Tres Cruces do not belong to the Cordillera de los Andes ; that the intermediary volcanoes do not form part of it, and that the Mounts San Francisco, Incahuasi, Fraile, el Muerto, Ojos del Salado, and Solo belong to that class ; that from Mount Tres Cruces to Mount Juncal or Wheelwright, there exists no deviation of the Cordillera de los Andes towards Mount San Francisco ; that the basin to the west of Mount San Francisco does not belong to the basin of any river ; that it is an enclosed basin, like that of the plain of Vega to the east of San Francisco, and like many others which are found to the north and south of the same ; and that the passage where the provisional landmark was placed is situated far outside the main crest of the Andes, as stated by the Chilian geographer, San Roman.

The insistence of Chilian geographers in carrying out the frontier line to the San Francisco Gap, thus departing from the longitudinal line of the high crest of "the true and only Cordillera de los Andes," as Señor San Roman * classifies it, had its explanation. Chile contended that she had incorporated the Puna de Atacama with her territory. Had this been the case, the San Francisco road would have been necessary to her in order to facilitate the communication between the province of Copiapó and the southern part of the Puna. Therefore, the Chilian Expert proposed the abandonment of the Andean crest and the planting of a definitive landmark in San Francisco gap, because if the Argentine Republic retained her dominion over the region surrounding that mount, it would have been difficult to reach the southern Puna starting from Copiapó, without crossing in part through Argentine territory.

Whilst Chile hoped to incorporate the Puna de Atacama, her interest in the road leading to it was very clear, but that interest for defending with so much eagerness a frontier which was not the one agreed upon, has now disappeared, and today geographical and political reasons condemn the Chilian Expert's proposed line. The Puna de Atacama is at present an unquestionable part of the Argentine dominion, according to the resolution of the Commissioners *ad hoc*, who solved the question in 1899, and that resolution has been already accepted by both Republics.

* Vol. 2, p. 703.

To elucidate the divergence which has arisen from $26^{\circ} 52' 45''$ as far as Mount Tres Cruces, it is necessary to indicate the principal geographical features of the region, and, besides, to consider some of the antecedents connected with the settled boundary to the north of that parallel. The study of Pirca de Indios and San Francisco landmarks would be impossible if restricted to those gaps, and, therefore, though the northern zone is extraneous to the present controversy, some explanation relating thereto will be entered upon in the following paragraphs.

2. DEMARCATION IN THE NORTH. DIVERSE CHAINS OF MOUNTAINS.

When the Treaty of 1881, the Protocol of 1893 and the Agreement of 1896 were framed, both the Argentine Republic and Chile knew that the mountainous region to the north-west of the former contains two great ranges separated by a high plateau, upon which there rise groups of mountains more or less isolated, the eastern range forming the "Cordillera Real de Bolivia," and the western the true "Cordillera de los Andes." It would be superfluous to enlarge upon demonstrations with respect to those two ranges. Not a map can be found which gives the name of "Cordillera de los Andes" to the eastern chain, and on the other hand, all the geographical authorities agree in calling the western chain by the name of "Cordillera de los Andes." The former, the back-bone of Bolivia, as it is termed by Sir Martin Conway,* dominates on the north-east the plains which are watered by the affluents of the Amazon, and on the west, between the two great ranges, lies the high Plateau of Bolivia, which according to the same authority, has an altitude between 12,000 and 13,000 feet above the sea.

There is no necessity for considering the portion of the Cordillera Real to the north of Mount Sorata which rises where its greatest elevations are found, and it is sufficient to say that this range to the south of Mount Sorata, containing summits which are worthy rivals of those of the true Cordillera de los Andes, continues in lofty heights from Illimani towards the south, deviating but little towards the centre of the Argentine territory. Although its continuity

* Explorations in the Bolivian Andes : Geographical Journal, vol. 14, London, 1899, p. 14.

is occasionally interrupted, and its altitudes in some districts are comparatively low, yet the range does not finally disappear until it nearly reaches Patagonia. The high chains of the Argentine provinces of Jujuy, and part of those of Salta, Catamarca and Rioja belong to this system, and one of its summits, Mount Aconquija, (17,881 feet, 5458 metres), dominates the plain of Tucuman, and the dry beds of the ancient salt lakes in the neighbourhood.

Sir Martin Conway, describing the Bolivian Andes, mentions two rivers, viz. the Maperi, and the La Paz, the former of which in its upper course has cut its way on the western slope to the north of Mount Sorata, while the latter, rising on the western slope, has broken through the Cordillera Real south of Illimani, and forms a tributary of the Beni branch of the Amazon. He points out that the eroded beds of the streams are deepest close to the highest summits, just as he found to be the case in the Karakoram Himalayas ; a feature which has also been observed in the true Cordillera de los Andes. The La Paz River rises to-day in what was anciently the Pacific drainage of South America, and flows from the western slope of the range, while one of its affluents rises in the plain outside the range, without altering the general watershed of the Cordillera Real. This example of a change of drainage by capture of streams, which is well illustrated in the sketch map that accompanies Sir Martin Conway's Report, (Plate XXVI.) is worthy of notice, because similar cases in the same range farther south have an intimate connection with the Argentine-Chilian boundary question, and with the differences submitted to Arbitration. Surely if the watershed of the chain containing Mounts Sorata, Cacaaca and Illimani had been stipulated as a boundary it is most probable that the dividing line would *pass* along the summit of the Cordillera Real and not to its foot at the west of La Paz, nor even more to the west of the sources of the River Sapahaqui ; the river would have been set aside because it does not rise in the Cordillera but beyond it, or rather some of its tributaries rise on the western slope of the Cordillera and others rise on the plateau.

All travellers who have visited Bolivia will say that the River La Paz flows through the plateau regions at first, which is not a part of the Cordillera Real, having its origin not far from the south-eastern end of Lake Titicaca.

For fifty miles, it skirts and exposes, sometimes to depths of a thousand feet, the vast alluvial deposits of the Titicaca basin. Sweeping in a bold curve around the base of Mount Illimani, it saws its way through the Cordillera in a gorge about 600 feet deep and about 50 feet wide. Laden with the alluvium through which

it tears its way in the fifty miles of its upper course, it then rushes north to join the Beni affluent of the Madeira branch of the Amazon river. About ten miles from the point where it rises, it traverses the city of La Paz, a little below which it receives, from the north-western slope of Illimani, a small stream called the Chuquiaguillo, famous for its auriferous wealth. Before cutting through the Cordillera Real the La Paz River receives the drainage of the entire western and southern slope of Illimani and a considerable quantity of storm-water from the gulches which have been worn into the eastern edge of the Titicaca plateau.

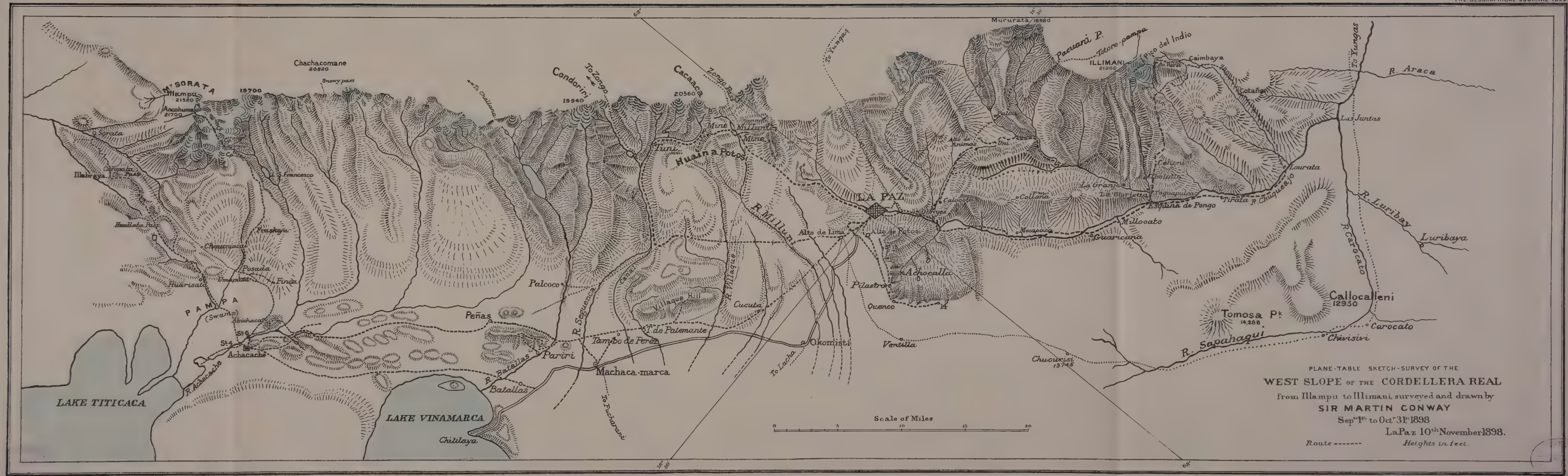
Colonel George Earl Church, who is well acquainted with the river, observes that the volume of detritus that it carries is astounding. He says:—

“Immense quantities of detritus have found their way down the Andes. The volume carried by the little river La Paz, the remotest branch of the Beni, is astounding. I once descended it to ride round the base of Mount Illimani. The river is so hemmed in between the material of the Titicaca basin, and that monarch of the Andes, that I had to ford it 108 times in one day. It has cut a profound gorge through the inland range, perhaps fifty feet wide and 600 feet deep. *

The prolongation to the south of the Cordillera Real de Bolivia offers several breaches comparable with those of Maperi and La Paz by which the waters of its western slope flow to the east and *vice versa*; one of these breaches contains the River San Juan, and further on in the section of the range which till 1893 separated the Argentine provinces of Jujuy, Salta and Catamarca from the Puna de Atacama, then under discussion between Bolivia and the Argentine Republic, the River Susques or River de las Burras intersects the main chain between Mounts Pucas and Ranguel.† Then through the deep gorge which it has worn, the river Burras flows into the “Salina Grande,” in the vast depression situated at the eastern foot of the chain which has lofty summits, 5500 to 6000 metres (18,040 to 19,680 feet) high, such as the Incahuasi, Pucas, Ranguel, Trancas, Tucli, Mojon, Saladillo, Toro, Muerto, Cachi, Juere Grande, Cerro Blanco, Cerro Condorhuasi and Cerro Gordo. The Cordillera Real continues to the south of Cerro Gordo, where through another narrow gorge runs the River Patos, but in an opposite direction, viz.—from the east to the west, emptying into the “Salar de Ratones” in the Puna de Atacama.

* Argentine Geography and the ancient Pampean Sea : Geographical Journal, October, 1898.

† River Susques is formed by three streams, the northern one (Rio Coranzal), and the eastern (Ojo de Agua) are small, while the southern river of Pastos Chicos is much longer, and takes its rise in the angle formed by the ridge of Lari and the Cordillera Real.



SIR MARTIN CONWAY, 1898.
Western Slope of the Cordillera Real de Bolivia from Illampu to Illimani.

After that break the chain rises again majestically with the snow-capped peaks of Aguas Calientes, Diamante, Vicuñaorco, Lagunas Blancas, Cerro Negro, Cerro Azul, extends through the chain of Tolar and Moradito, and is then intersected for the fourth time, from west to east, by the river of Tinogasta in the Province of Catamarca; it then rises once more in the Sierra de Velasco, 4000 metres (13,120 feet) high in the Province of La Rioja; descends to the plains; re-appears in the Sierras de los Llanos and Sierra de San Luis, and finally disappears in the distant Pampas, its real termination being still unknown.

In the Puna de Atacama, there rises to the west of the Cordillera Real de Bolivia and parallel to it, an intermediary longitudinal chain, of lesser altitude and generally less continuous, which can easily be distinguished from the other two—Cordillera Real and Cordillera de los Andes—and like these, follows a general north and south direction, running from the north of 23° S. lat. to the Sierra de la Huerta in the province of San Juan (Argentina), after which the continuity is interrupted, but one of its ridges rises again with inconsiderable elevation in the hills of Pencoso in the plains of the province of San Luis.

This intermediary chain has its importance in the boundary question, as the mountains of San Francisco and Incahuasi rise near it in the proximity of parallel 27° S. It is well then, to characterise it, mentioning some of its principal summits. From the north to the south are the Cerro San Pedro, 5700 metres (18,701 feet); Cerro Ciliola, 5600 metres (18,373 feet); Cerro Jama, 5150 metres (16,897 feet); Cerro Tultul, 5200 metres (17,064 feet); Cerro Calalaste, 5350 metres (17,553 feet); Negro Muerto, 5894 metres (19,338 feet); Cerro las Peladas, Cerro Palca, 5480 metres (17,979 feet), and the well-known ridge of Famatina, the highest summit of which attains 6130 metres (20,112 feet).

South of the depression of Antofalla, the western ridge of this chain divides into two parts, its general direction being modified by the tremendous volcanic action, which has covered with lava and ashes the neighbourhood of Mount San Francisco, 19,685 feet (6000 metres) and Mount Incahuasi, 21,719 feet (6620 metres); thus forming the Sierra Cazadero Grande, with Cerro Aguas Calientes, 18,372 feet (5600 metres), and other summits the altitudes of which vary from 9840 to 16,400 feet (3000 to 5000 metres); then descends into the Sierra de Umango, and somewhat more to the south runs into the chain at the southern termination of Sierra de Famatina.

To the W.S.W. of Cerro San Francisco, dominating the old tectonic

depression, another parallel chain not so important as that previously quoted may be distinguished. To this chain, the original contour of which has been also modified by recent volcanic action, belong the mountains Ojos del Salado, the ridge to the east of the longitudinal depression of Lagunas Verdes, the Cerro Faja, the Cerro Reclus, 20,670 feet (6300 metres); the Veladero, 20,998 feet (6400 metres); and the Cerro Fandango, 18,340 feet (5590 metres). Further south its ridges form the mountains of Pié de Palo, Villicum, Tontal and Paramillo de Uspallata.



MOUNT PEINADO (5703 M. ; 18,908 F.).

The Chilian Representative has on several occasions mentioned his high appreciation of two geographers : Dr. Hermann Burmeister, late Director of the National Museum of Buenos Aires, and Dr. Louis Brackebusch, Ex-Professor in the National University of Córdoba. Both have visited the interior of the Argentine Republic and the region situated to the north of 34° S. lat., and as they are unimpeachable authorities for the Chilian Expert, it is convenient that their opinions should be known to the Tribunal, so much so, since the Argentine Expert admits the accuracy of the observations made by those geographers in the zones which they have personally surveyed.

The opinions of Dr. Burmeister will be quoted later. Dr. Brackebusch, in

his work on the Chilian-Argentine* Cordillera, describes in terms generally similar to those here made use of, the mountains which are mentioned, and referring to the last named chains, says that the whole mass called by Stelzner "Antecordillera," by Burmeister "pro-Cordillera" and "contra-Cordillera," and by Strobel "pre-Cordillera" (names which have only a local value, so that a discussion on the superiority of one of these over the other appears to him useless) ends near Cacheuta, to the south of Mendoza, although probably the chain is continued again to the east of San Carlos, and further south in San Rafael, in the mountains of the Nevado, Cachahuen, Auca Mahuida, Sierra Valcheta, and Sierra



MOUNTS LASCAR (5870 M.; 19,259 F.) AND HECAR IN THE
CORDILLERA DE LOS ANDES.

General Roca, and adds "neither is the whole of this chain considered as part of the Cordilleras."† In another chapter (that has not been translated) of the same

* La Cordillera Chileno-Argentina por el Dr. Luis Brackebusch (Anales de la Universidad de Chile, 1894) translated from a larger report published in the Zeitschrift der Gesellschaft für Erdkunde zu Berlin, Vol. XXVII., 1892.

† Dr. Brackebusch frequently falls into error when he refers to points which he has not personally visited. The Sierra of Valchetas and the hills called "Sierra General Roca," do not belong to those mentioned as further north. The prolongation of those elevations forms those of Campana Mahuida, Catalin, Collon Cura, Calgadep, Eastern Tecka and Gennua.

Report, Dr. Brackebusch says that the pass of San Francisco is not situated in the Cordillera de los Andes, but in an eastern lateral chain.

Recapitulating, it may be asserted that in the north-western region of the Argentine Republic there exist :—

1. *The Cordillera Real of Bolivia*, which after being cut in its principal chain by the Rivers San Juan, Burras, Patos and Tinogasta, is lost in the centre of the territory.

2. A parallel chain, less important in its mass, which, passing to the east of the extinct volcano of Sapaleri, opens sometimes in two branches interrupted by



MOUNT TUMIZA (5670 M.; 18,602 F.) IN THE
CORDILLERA DE LOS ANDES.

valleys and rivulets, and to it belong Mount Negro Muerto in the eastern chain which is prolonged as far as Famatina, and Mounts San Francisco, Incahuasi, and Cazadero Grande, more or less connected with the western ridge. Between these two chains are found the depressions of the meadows of San Francisco and the longitudinal valley of Cazadero Grande, Chaschuil and Vinchina.

3. A chain which runs from the Cerro Ojos del Salado, at 27° S. lat. to the south of the transversal depression called the Pass of San Francisco, and which takes a southward direction. It is separated from the main chain of the

Cordillera de los Andes by a longitudinal depression, which begins at the eastern foot of the Nevado of Tres Cruces, is interrupted by volcanic tuff deposits to the east of the Cerro de Patos and the volcano of Tres Quebradas or Aguita, and reappears where it contains the Lagunas Verdes, and farther south, in that along which runs the river Salado, the northern affluent of the river Jachal. To this chain belong the Cerros Nacimientos del Cazadero, Faja, Reclus, Veladero and Fandango, and the mountains of the Provinces of San Juan and Mendoza, to the east of the Cordillera.

4. *The true "Cordillera de los Andes."*



MOUNT LEJÍA (5650 M. ; 18,537 F.) IN THE
CORDILLERA DE LOS ANDES.

5. *The Cordillera de la Costa*, running parallel to the Pacific Ocean, and separated from the Cordillera de los Andes by independent ridges and by the central valley of Chile as far as 42° S. lat., where the Pacific longitudinal channel takes the place of that valley until the end of the continent is reached.

Amongst these chains, the characteristic longitudinal direction of which has been shown, there appear here and there (as mentioned in the observations of Señores Bertrand, San Roman and Muñoz, and as the Argentine Expert has personally observed) short parallel ridges and volcanoes, either in groups or isolated.

Amongst these the principal summits are those of Antoco, 5800 metres

(19,029 feet), Pastos Grandes, 5350 metres (17,553 feet), Quiron, Mojones, 5500 metres (18,045 feet), between the eastern and the intermediate chains; and those of Rincon, 5450 metres (17,881 feet), the group formed by the volcanoes of Antofalla, 6100 metres (20,014 feet), Patos, 5720 metres (18,767 feet), Cajero, 5700 metres (18,701 feet), and Aguada, 5800 metres (19,029 feet), the volcanoes and *Cerros* Peinado, Dos Conos, Cóndor, Falso Azufre, San Francisco, Incahuasi, El Fraile and Ojo de las Lozas, situated between the intermediate chain and the *Cordillera de los Andes*. Farther south rise the



MOUNT MIÑIQUES (5900 M.; 19,357 F.) IN THE
CORDILLERA DE LOS ANDES.

Mounts Pabellon de Laguna Verde, 5790 metres (18,996 feet), Nacimiento del Jagüel or Mount Pissis, 6750 metres (22,146 feet), and Bonete, 6730 metres (22,080 feet). The figure here inserted of Mount Peinado is one of these isolated summits to which San Francisco belongs.

The accompanying map shows these chains and ridges and makes apparent the general direction of the ancient folds, in places where it is now difficult to distinguish them owing to subsequent volcanic eruptions and upheavals which, filling up and parcelling out the large ancient lake, have raised extensive tracts of ground which in times not very distant contained vast watered areas.

Of the several chains mentioned, the predominating one is the main chain of the Cordillera de los Andes, along which, exclusively, the boundary line is to run. The reproductions inserted in the text of some of its peaks will contribute to make apparent the characteristics which distinguish it, in such a manner that any confusion with the surrounding mountains is impossible.

Its chief summits between 23° S. lat. and Cerro Bayo are :—Licancaur, 6000 metres (19,685 feet), Tonar, 5620 metres (18,439 feet), Putana, 5230 metres (17,159 feet), Potor, 5500 metres (18,045 feet), Colache, 5670 metres (18,603



MOUNT SOCOMPA (6080 M.; 19,948 F.) IN THE
CORDILLERA DE LOS ANDES.

feet), Abra Grande, 6150 metres (20,178 feet), Lascar, 5870 metres (19,259 feet), Tumiza, 5670 metres (18,602 feet), Lejía, 5650 metres (18,537 feet), Overo, 5730 metres (18,800 feet), Agua Caliente, 5720 metres (18,767 feet), Ipira, 5600 metres (18,373 feet), Miñiques, 5900 metres (19,357 feet), Capur, 5260 metres (17,258 feet), Pular, 6340 metres (20,800 feet), Socompa, 6080 metres (19,948 feet), Socompa-Carpis, 5370 metres (17,618 feet), Tecar, 5590 metres (18,340 feet), Inca, 5500 metres (18,045 feet), Llullaillaco, 6620 metres (21,720 feet), Agua Caliente, 5250 metres (17,225 feet), Azufre, 5680 metres (18,636 feet), Cerro Bayo, 5300 metres (17,389 feet), Cerro Agua de la Falda,

5470 metres (17,947 feet), Cerro del Medio, 5380 metres (17,651 feet), Peinado Falso, 5700 metres (18,701 feet), Cerro Colorado, 5840 metres (19,160 feet), Vallecito, 6060 metres (19,882 feet), Cerro de Laguna Brava, 5338 metres (17,513 feet), and 5420 metres (17,782 feet), Juncalito, 5950 metres (19,521 feet), Sierra Nevada, 6100 metres (20,013 feet), Mortero, 5924 metres (19,436 feet), Juncal, 5813 metres (19,072 feet), Cerro de Tres Cruces, 6640 metres (21,785 feet), 6780 metres (22,245 feet), 6246 metres (20,492 feet), Tres Quebradas, 6280 metres (20,604 feet), and 6040 metres (19,817 feet), Dos Hermanas, 5500 metres (18,045 feet), and 5260 metres (17,258 feet), Cerro Bayo, 5030 metres



LLULLAILLACO VOLCANO (6620 M.; 21,720 F.) IN THE
CORDILLERA DE LOS ANDES.

(16,503 feet). Cerro Bayo is situated at the point where the Cordillera Darwin separates from the *Cordillera de los Andes*; according to Señor San Roman, it reunites again by the Sierra Barros Arana, at the height of the Cerro Tatio.

The Cordillera de los Andes, perfectly discernible, comprises within it Pirca de Indios gap, where the Argentine Expert proposed to fix the landmark No. 1. Plate XXVII. represents the corresponding part of that Cordillera, and shows in it the true boundary line.

Mount Juncalito.

Pirca de Indios Gap.

Mount Tres Cruces.



Juncalito Stream.

[Face p. 590.]

MOUNT JUNCALITO, OR WHEELWRIGHT (5900 m.; 19,357 f.), AND PIRCA DE INDIOS GAP (4590 m.; 15,059 f.), Argentine landmark No. 1, in the main chain of the Cordillera de los Andes.

(From a photograph taken from the west, at the origin of Juncalito Stream.)

3. THE CORDILLERA DE LOS ANDES ON THE NORTH, AS DESCRIBED BY THE CHILIAN GEOGRAPHERS SEÑORES BARROS ARANA, BERTRAND, SAN ROMAN AND MUÑOZ.

From 23° S. lat. to the south the Cordillera de los Andes, as has already been said, is formed by the range which contains hundreds of high peaks and, among them, those which Señor Amado Pissis and Señor Juan Maria Mujia



CORDILLERA DE LOS ANDES FROM LLULLAILLACO VOLCANO
(6620 M. 21,720 F.;) TO AZUFRE VOLCANO (5680 M.; 18,636 F.).

fixed in 1870 as situated "on the crest of the Cordillera," or in the "anticlinal line of the Andes," viz., "Pular," "Tonar" and "Yuyayaco."

1. Señor Barros Arana, the Chilian Expert, has acknowledged that this range, which sometimes is called by him "western Cordillera de Bolivia," is the true Cordillera de los Andes; and in a list of "*Principal heights of the range of the Andes*" he includes the volcano Llullaillaco (Yuyayaco of Señores Pissis and Mujia).* He

* *Geografía Física*, 1874, pp. 325 and 326.

has made a similar acknowledgment in his communication to the Argentine Expert, Señor Pico (January 18, 1892), and in the Record dated September 3, 1898, when he said that this range on its highest crests constituted "the traditional boundary" separating Chile from the high tableland of Atacama, and that—

"He acknowledges that if the boundary which, before that epoch (the war in 1879, already referred to) separated Chile from the Bolivian Puna, say the western limit of the territory which went under the said name, were now to be fixed, the line indicated (by the Argentine Expert) would scarcely deviate from the one which he would lay down in the greater part of its extent."

2. Señor Alejandro Bertrand shared the same opinion with Señores Pissis and Barros Arana, when the Chilian Government sent him in 1884 to determine, with the greatest exactitude, the line of the highest summits of the Andes, and to survey the declivities on either side from the "volcano Licancaur" near "San Pedro de Atacama" as far as the sources of the river Loa, and the mountain ridges which extend in the same zone between the Cordillera de los Andes (mentioned in the Treaty of 1874 between Chile and Bolivia) and the "Cordillera Real." *

Señor Bertrand, in giving an account of his surveys, makes the following important declaration: Of all those Cordillera branches, "geographers used to give the name 'Andes' to the most western, because it is that which deviates less from the general direction." † After thus distinguishing the Andes from the "Cordillera Real de Bolivia," he adds:—

* Bertrand, *Memoria sobre las Cordilleras del Desierto de Atacama*, Santiago, 1885, p. 9.—The instructions given by the Chilian Government to Señor Bertrand were:—

"1. You will endeavour, in the first place, to determine, with the greatest possible exactness, the line of the highest crests (cumbres) of the Andes, examining the slopes (declives) on both sides, from the volcano Licancaur, near San Pedro de Atacama, to the sources of the river Loa.

"2. You will next explore the mountain ridges which, within the same region, stretch between the Andes and the Cordillera Real.

"3. You will study, lastly, the portion of territory included between the boundary lines separating Bolivia from Chile and from the Argentine Republic, as far as the prolongation of the parallel of 24° S. lat.

"4. In your excursion you will obtain the following data:—The geographical position of San Pedro de Atacama; latitude of the stations or camps, and, if it be possible, their longitude; the distances travelled from point to point; determination of the most notable crests (cumbres), taking care to ascertain their correct names; barometric heights of the points of the path (trayecto); places at which water can be obtained, pastures, etc.

"5. With all these data, and with the others which you may collect in your explorations and think worthy of interest, you will prepare a report which you will present to this Ministry at the end of your labours, accompanying it with a general map of the region through which you have travelled."

† *Memoria sobre las Cordilleras del Desierto de Atacama*, etc., Santiago, 1885, p. 196 and following.

P. 197.—“The second orographic zone includes the groups of elevated summits which form what more properly can be taken as constituting in that region the Andean Cordon so well characterised in the south of the Republic.”

This chain, according to Señor Bertrand, comprises the summits of Licancaur, Potor, Hécar, Láscar, Tumisa, Miñiques, Pular, Socompa and Llullaillaco. He then says :—

P. 198.—“To the east of the Andean cordon, there extends a vast, undulated region, the mean height of which is between 3500 metres (11,484 feet) and 4000 (13,123 feet), properly called ‘La Puna,’ from a *quichua* word, which means elevated region. There are scattered in this region many *groups of mountains*, which form our third orographic zone ; among these there figure the Volcano Oyagua, the Mounts of Tapaquilcha, the snow-capped mountains of Laguna Colorada, Torque, Quetena, Zapaleri, Lina, del Rincón, Pocitás, Antofalla and Mojones ; lastly those of Laguna Brava, SAN FRANCISCO and the Peinado, the summits of which are not inferior to those of the second zone (the Andean Cordon), the difference being that *these groups are ISOLATED*, having between them passes, the height of which does not reach 5000 metres (16,405 feet).”

P. 198.—“After this rapid enumeration it is easy for us to define the ‘Puna’ as an *expansion of the summit of the Cordillera, the flat parts of which have an altitude between 3500 (11,484 feet) and 4000 (13,123 feet) metres, bounded on both sides by a succession of mountain ridges, which ON THE WEST FORM THE ANDEAN CORDON, and on the east the fourth and fifth of the orographic zones* (into which he divides the portion of the Cordilleras comprised between 21° and 27° S. lat.)”

In another Report made by order of the Chilean Government, Señor Bertrand, referring to the Treaty of 1874 between Chile and Bolivia, quoted the first Article of the Agreement of 1866, which stated that the demarcation line may be in the future the parallel 24° S. lat. from the coast of the Pacific Ocean to the *eastern boundaries of Chile*, adding that—

“In consequence of the difficulties presented by the Bolivian Expert and of other causes, the Protocol of December 5, 1872, was drawn up, Article 1 of which declared that the eastern boundary of Chile, of which mention is made in Article 1 of the Boundary Treaty of 1866, is *the highest crests of the Andes*. No doubt these terms were found not very explicit (as, in fact, they are not) when the Treaty of August 1874 was made, for this is stipulated in Article 1 : ‘the parallel of 24° from the sea to the Cordillera de los Andes in the *divortia aquarum* is the boundary between the Republics of Chile and Bolivia.’ The Expert’s demarcations of 1870 were accepted for the purpose of the Treaty, *agreeing tacitly that the said summits were in the divortia aquarum of the Andes*.”

Señor Bertrand considers, however, that it would be *useless to search in the Andes between the 22° and 27° S. lat.* for a line of watershed ; therefore, in his

opinion, the basis of the titles relating to the territories which have that demarcation, are faulty.*

In a second report addressed to the Minister of the Chilean Republic on the Argentine-Bolivian Treaty of 1893,† Señor Bertrand reproduces and emphasises his observations *upon the Cordillera de los Andes, the Puna de Atacama and the Cordillera Real de Bolivia*. He says :—

“Should Your Excellency examine the enclosed map, you will observe that from 28° S. lat. where the opposite slopes down which flow the rivers Copiapó and Blanco or Bermejo meet near Mount Potro, the orographical and hydrographical configuration varies considerably towards the north. On the east the Sierra de Laguna Blanca, Nevado del Diamante, de Cachi, Ciénega Grande, Trancas, Cerros Incahuasi y Granadas, on the west the heights of Cerro Bravo, Doña Inés, Chaco, Juncal, Llullaillaco, Socompa, Pular, Miñiques, Toconao, Lincancaur, Vizcachillas, etc., form two ramparts of snow-capped summits” (Cordillera Real de Bolivia and Cordillera de los Andes) “between which rise hundreds of other mountains as elevated as the above mentioned, and possessing the peculiarity that the waters flow down from their slopes into large salt plains without having any outlet to either of the oceans through the lateral Cordilleras. *It is indispensable to gain a good knowledge of this configuration* in order to appreciate the ambiguity and confusion resulting from the employment of the expressions: ‘Cumbres de la Cordillera,’ ‘Cima de los Andes,’ and even that of *divortia aquarum* as applied to this region.”

Señor Bertrand continues his observations by saying :—

P. 115.—“The Cordillera de los Andes, in the region to which we are now referring, consisting of mountains of 150 to 200 kilometres (93·2 to 124·3 stat. miles) in breadth, it is then well to ask in the first instance *what is understood by the line uniting the highest summits*, if it is the cordon containing a greater number of highest summits in a continuous line, or if it be a line which passes by the summits of the greatest elevation, passing from one cordon to another. No matter what the rule adopted may be, the demarcators will meet with the same difficulty: the measurements of the altitudes of the summits in this region of the Andes are still scanty and too imperfect to be accepted as exact within 100 or more metres (over 300 feet), and if they wished to adhere to the Treaty, *they would often have to proceed to a very careful measure of level to decide by which of two summits separated by a great distance from east to west the dividing line should pass.*”

Such doubts could not exist then nor to-day. The boundary between Chile and Bolivia was the Cordillera de los Andes, the crest or anticlinal line of which

* Documentos oficiales relativos a los límites entre Chile, Bolivia y la República Argentina en la region de Atacama, pp. 27 and following, Santiago, 1898.

† Ibid., pp. 93 and following.

was determined in 1870 by the Chilian and Bolivian Experts, Señores Pissis and Mujía. That boundary was to run by the volcanoes Licancaur, Pular, Tonar and Llullaillaco, volcanoes also considered by Señor Bertrand as included in the 'Andean Cordon,' or 'Chain of the Andes'* *forming the true Cordillera* which

* Bertrand, *Memoria sobre las Cordilleras del Desierto de Atacama*, etc., p. 196.—"Of all these Cordillera branches, geographers used to give the name *Andes* to the most western, because it is that which deviates less from the general direction; Señor Hugo Reck does so when dealing with the orography of the Bolivian tableland, and calls the eastern, *Cordillera Real*; but this last does not unite with the first between 23° and 24° of S. lat., as Señor Reck believes, but continues further south without varying much from its original direction. To the south of the parallel of 23° the *Cordillera Real*, however, does not preserve the continuity which it presents to the north of that parallel, nor is there between it and the *Andean cordon* any other continuous snow-capped mountain chain (*serrania*) to take its place. In general it is difficult to compare the orography of the region we are about to describe either with the clear separation of *Andes* and *Cordillera Real* of Señor Reck, or with the parallel cordons of Señor Moussy.

"As it is necessary to introduce a certain order in our exposition, we shall divide into five orographic zones parallel to the meridian, the portion of the Cordilleras comprehended between the parallels of 21° and 27° S. lat. These various zones do not form cordons properly speaking, but rather groups of summits (*cimas*), and we do not found our classification so much on the height of these as on the elevation above the sea-level of the more or less even ground which serves as a base.

"We shall not enter here on the consideration of the zone of the coast, which has not been included within the range of our studies, nor has it a place on the map which we have drawn.

"*The first orographic zone*, which leaves towards the west the region which is properly called desert (*despoblado*), deviates little from the meridian of 69° long. west of Greenwich. It begins to the east of the meridian, at the head of the ravines of Guatacondo, about 21°; it includes the mass of mountains, abounding in minerals, which enclose in three directions the river Loa, the mountains of Limon Verde, those of Caracoles, and further south, the Cordon of Varas, the Sierras of Sandon, Chaco Bolson, Doña Inés, Cerro Vicuña and Indio Muerto. The western base of this zone has a general altitude of 1500 to 2000 metres (4922 to 6562 feet) above the sea level, in its most northerly part, increasing in height towards the south. The Passes across these mountains (*serranias*) and their summits (*cimas*) follow the same law; as, while the Mounts of Paqui reach scarcely 4000 metres (13,123 feet), those of Caracoles, the Aguadas and the Quimal are 3500 to 4000 metres high (11,484 to 13,123 feet), and those of the Juncal and Doña Inés exceed 5000 metres (16,404 feet).

"*The second orographic zone* includes the groups of elevated summits (*cimas*) which form what more properly can be taken as constituting in that region the *Andean Cordon*, so well characterised in the south of the Republic. Beginning with the Volcano Olca, the snow-capped mountains of Aucanquilcha, Palpana, Polapi, San Pedro and San Pablo, Paniri, Puma Urco i Linzor, the groups of mountains (*serranias*) stretch more directly to the south by the summits of Tatío, Vizcachillas, Jorjéncal, Puripica, Licancaur, Pótor, Hécar, Láscar, Tumisa and Miñiques; thence the four summits of Miñiques, Pular, Socompa and Llullaillaco run from north-east to south-west. To the south of this last from the snow-capped mountain of Azufre, this zone is lost in a vast unexplored area, and seems to re-unite with the first in the crests of Doña Inés and Cerro Bravo. The western base of this zone is, in its north part, the upper course of the Loa, and then the succession of valleys draining either into the Loa or into the salt plains of Atacama and Punta Negra. The north and southern ends of this base rise to more than 3000 metres (9843 feet) above the sea, while the general altitude of the central portion is about 2400 metres (7875 feet). Although this Cordillera cannot be crossed, as some say, at any point whatever, it has certainly numerous Passes, as will be seen from the information which we shall insert further on.

"To the east of the *Andean Cordon* there extends a vast undulated region the mean height of which is between 3500 and 4000 metres (11,484 and 13,123 feet), properly called the 'Puna,' from a Quichua word, which means elevated region. There are scattered in this region many groups of mountains which form our *third orographic zone*; among these there figure the volcano Oyagua, the Mounts of Tapaquilcha, the

according to him limits on the west the high plateau of the 'Puna.' This fact has been recognised lately by the Commissioners appointed to settle the Experts' differences concerning that region, since they have demarcated the

snow-capped mountains of Laguna Colorada, Torque, Quetena, Zapaleri, Lina, del Rincon, Pocitas, Antofalla and Mojones; lastly, those of Laguna Brava, SAN FRANCISCO and the Peinado, the summits (cumbres) of which are not inferior to those of the second zone, the difference being that these groups are ISOLATED, having between them Passes the height of which does not reach 5000 metres (16,405 feet).

"The fourth orographic zone may be considered as a prolongation of the Cordillera Real de Bolivia, in whose broad ridge (dorso) rise the notable Mounts of Chorolque, Santa Isabel and Lipez; in fact, following thence the direction of the meridian, there are the Mounts of Granadas, Incabhuasi, Acay and the mountain chain (serrania) of Cachi. We meet this same zone further south in the summits (cimas) of the Quilmes and of the Sierra of Gualumpaja. This zone forms, in general, the eastern boundary of the Puna, with the exception of that which is called Jujuy which is prolonged still further east. The eastern base of this zone does not fall below 3000 metres (9843 feet), and reaches in some parts 3500 metres (11,484 feet).

"Our fifth orographic zone is formed in the south by the Sierra of Aconquija, that of Calchaqui, and further north by the snow-capped mountains of Castillo; it forms the eastern boundary of the Puna of Jujuy by means of the Sierras Chañi and Aguilar, being continued much further eastwards by the Sierra of Zenta, outside the limits of our map. The eastern base of this zone is rather low, only in few places exceeding 1000 metres (3281 feet) and depressing until 450 metres in Tucuman. After this rapid enumeration it is easy for us to define the *Puna* as an expansion of the summit of the Cordillera, the flat parts of which have an altitude between 3500 to 4000 metres (11,484 to 13,123 feet), bounded on both sides by a succession of mountain ridges (serranias) which, on the west, form the *Andean cordon*, and on the east, the fourth and fifth orographic zones. The true *relief* (relieve) of the region of the Puna is, moreover, accentuated by numerous groups of mountains distributed with the greatest irregularity, but it may be observed, as we shall note in treating of the hydrography, that the general direction from north to south predominates.

"Although these groups do not properly form chains, the area which lies between one crest (cumbre) and another is at a higher level than the lateral bases, thus constituting true valleys (abras) or passes (portezuelos), whose elevation above the sea varies between 4200 and 4900 metres (13,780 and 16,077 feet). This statement is as applicable to those which give access to the lower regions which extend east and west of the Puna as to those which must be surmounted to pass from one portion of the Puna itself to another.

"4. Hydrography. General Idea.

"We know already that the Cordillera de los Andes in its southern part forms a well-defined cordon, and constitutes the *divortia aquarum* between the waters which flow to the Atlantic, and those that more rapidly run towards the Pacific.

"Although this dividing ridge is not formed by the highest crests of the Cordillera, its course is not on this account less clear and indivisible; thus the imagination could strictly follow, step by step, the progress of two twin drops of water which have fallen side by side on the edge of the Araucanian Cordillera, and which might glide down opposite slopes, one on the east and the other on the west, from the valley (quebrada) to the torrent, from this to the rivulet, to the marsh (estero), and to the river, until the one should mingle with the waters of the Pacific among the sands of the Bio-Bio, and the other should reach those of the Atlantic, lost in the waters of the Rio Negro at the distance of 1300 kilometres (800 miles) from the former.

"Up to 32° S. lat., the separation is always very clear, though the progress of the waters is not continuous on the Argentine side because the rivers of Mendoza and San Juan have no permanent or direct debouchment in the ocean. From 32° to 28° S. lat. the want of continuity of the crest of the Andes of which Señor Moussy speaks, is accentuated, forming great extensions of very high ground without therefore being tablelands as the maps appear to figure them, except that they appear in blank because their mountain chains are unexplored and unknown. Notwithstanding the multiplicity of the cordons, the hydrographic system is continuous, that is to say, the drainage of all the valley's rivulets and rivers, unite successively with one another to form the river Desaguadero.

"To the north of the 28° S. lat. there is to be found a new hydrographic conformation consisting of

boundary in that part of the frontier by tracing the line between Socompa and Sierra Nevada, and passing, therefore, by the summit of the volcano Llullaillaco.*

To follow clearly the exposition, it must be remembered that the first Article of the Boundary Treaty between the Argentine Republic and Bolivia ratified on March 10, 1893, says that the two nations are separated—

“ On the west by the line uniting the most elevated crests of the Cordillera de los Andes from the extreme north of the limit of the Argentine Republic with Chile up to the intersection with 23° S. lat.; from whence the said degree will be followed up to the intersection with the most elevated point of the chain of Zapaleri.”

In his Report, Señor Bertrand recognises that it was possible, owing to the wording of the Treaty, that the name *Andes* would be understood as referring to the western chain of the Andes, the nearest to Chile, to “ which some geographers have given specially the name of *Andes*,” and he advised his Government that their Foreign Office should apply to the proper quarter for an explanation of the meaning of Article 1 already mentioned as regards the territories in question occupied by Chile since 1879 on the south of parallel 23° S. lat. †

The line of *highest summits of the Cordillera de los Andes* (or of the *Andean Cordon* of Señor Bertrand) is clearly visible throughout its whole length as far as parallel 52° S. lat. The bifurcations which exist in the main chain are not so extensive in the transversal direction as to require the measurements of level referred to since there is no difficulty to find clearly in that chain its own and peculiar dividing line of waters, nor to determine its slopes on the north and on the south.

independent basins or beds whose waters do not visibly feed any river, and which, moreover, are separated from the neighbouring basins by elevations of the ground. This conformation is that which predominates in the Punas of Atacama, of Salta and Jujuy, of Lipez, Chichas and Oruro; it is evidenced by a bifurcation of the *divortia aquarum* of the Andes, into two branches; the western marks the boundary of the streams flowing towards the Pacific Coast, the eastern indicate those which, directly or indirectly, reach the Atlantic.

“ These two branches of the *divortia aquarum* are very winding: they have very acute angles pointing inwards, such as those which give rise to the river San Francisco or Fiambalá and the river San Juan Mayo, and only unite at 14° 30' S. lat., where the *divortia aquarum* regains its unity, which it then preserves to the northern extremity of the Andes.

“ Between the two principal branches into which the water-parting bifurcates, there exist many others which form the divide between the different basins or beds of which we have spoken. Of these, some are very extensive, as those of the lakes Titicaca and Poopó, while others are small, as the greater part of those which form the southern portion of the Puna, in the description of which we are concerned.”

* Meeting at Buenos Aires, March 23, 1899, in Documentos Relativos a la Conferencia de Buenos Aires, Santiago de Chile, 1899.

† It is convenient to point out that the opinion of Señor Bertrand as to the Chilian occupation of those territories is incorrect.

Señor Bertrand himself has practically shown that the work is not beset with the difficulties of which he speaks, since he determined with exactitude in a very short time, what he calls the *Andean Cordon*, and in it the line of the highest summits of the Andes and their slopes, in compliance with the instructions already mentioned which he received from his Government.

3. Besides those of Señor Bertrand, the Chilian Government had ordered careful investigations by Señores Francisco San Roman and Santiago Muñoz, who also acknowledged as "*Cordillera de los Andes*" the same "*Andean Cordon*" or "*the Andes*" of Señor Bertrand, determining clearly the principal line of its high summits, that is to say, the chain which contains the highest summits in a continuous line.

In fact, while Señor Bertrand carried on his surveys in the north and in the centre of the Puna de Atacama, Señor Francisco San Roman had entered on his work of exploring the desert of Atacama. This work lasted for three years, and is without doubt the most important that was accomplished in those regions prior to the Argentine-Bolivian Boundary Treaty.

On October 24, 1883, Señor San Roman informed the Chilian Government that he had determined the "*anticlinal line and the highest crests of the western cordon of the Andes,*" and in January 1884 he returned to undertake the investigation, in detail, of the mountain region *east and west of that Cordillera*.

In his account* of those investigations he says that Peñazco de Diego is "*at the foot of the anticlinal Cordillera, that is to say, the "Cordillera de los Andes" properly so called, the only one which by its culminating line determines the watershed (divorcio de las aguas) and separates Chile from the Argentine Republic.*"

Thus, Señor San Roman states definitely, with full exactness and clearness, what is understood by *Cordillera de los Andes*, as he gives this name to the principal normal crest of the western mountain range, which was afterwards called "*main chain (encadenamiento) of the Andes,*" and which may, in places, be cut by waters flowing from its eastern or Argentine slope (*vertiente*).

It has been said that the same idea of *Cordillera de los Andes* prevailed in Chile and in the Argentine Republic, as is shown by books and maps, but the opinion of Señor San Roman has great importance owing to his knowledge of the *Cordillera* and to his long continued intercourse with men of both countries well acquainted with these mountains. It is not only once that he exclusively applies

* *Desierto y Cordilleras de Atacama*, por Francisco J. San Roman, Santiago, 1896, vol. 1, p. 56.

the name of Cordillera to the general dominant crest. Referring to points in the immediate neighbourhood of the Peñazco de Diego, he adds :—

P. 59.—“To the south and north of Pircas Negras, in Peña Negra, Come Caballo, Quebrada Seca, etc., it was convenient to examine and to measure the ground. In a northerly direction there is detached, as an “anti-Cordillera,” *the majestic Cerro of the Nevado . . . de Jotabeche.*”*

Speaking of the regions situated further to the north he calls Anti-Cordillera, or Cordillera Domeyko, the chain which contains the mountains of Maricunga, Bravo, Pedernales, Doña Inés, Bolson, Chaco, Sapos, Sierra de Varas, Quinal, thus again considering as the Cordillera de los Andes only the chain in which rise “the highest summits.”

From the neighbourhood of the volcano Socompa, a “remarkable and lofty region of the Andes,” he witnesses “the spectacle of this wonderful chain of heights,” which “is incomparably beautiful and majestic, running thence directly north as far as the pyramidal Licancaur which there terminates it” (p. 147). From Tilomonte he sees, “immediately to the east, *the Cordillera de los Andes, like a colossal wall*, bristling with cones and chimneys.” . . . and “on the west, in the distance, on the clear horizon, of infinite depth, the outlines of the mountains of the central desert, and of the distant maritime region.” . . . (p. 150). †

He describes thus an opening or “pass” near this region :—

P. 241.—“The point in those latitudes for crossing the *Cordillera Real de los Andes*, which is prolonged as a more continuous and culminating range from Licancaur to the south, is presented at a pass (portezuelo) which is attained by gently ascending without any steep slope (cuesta elevada), and almost without the necessity of making a zigzag to reach it in the crest, *line of greater elevation*, or watershed.

* And he adds:—P. 189.—“Further on the ‘Vegas de Monroy,’ which have the appearance of a vast grazing ground, and lastly, the ‘Laguna seca’ above the slope (falda) of the Cordillera which encloses on the west the valley of Jorquera in the immediate neighbourhood of the ‘Gato’; a Cordillera to which we have given the name of ‘Darwin,’ and which further north, in Tronquitos, unites with that of Domeyko, which is nothing more than the prolongation of the former from the point where *it becomes more clearly defined as the Anti-Cordillera de los Andes.*”

† Señor San Roman shares the same opinion with Señor Barros Arana, who gives the name of great Cordillera de los Andes only to the central line, since he says that the transverse chain of Chacabuco quits the great Cordillera at the heights of the Juncal, and that there are various transverse chains which quit the Andes, running between this Cordillera and that of the coast. (Geografía Física, 1st edition, pp. 299 et seq.)

"Its height above the sea-level is 3,980 metres (13,059 feet), and its situation is to the south of the volcano Láscar and at the foot of the Tumisa, its latitude being $23^{\circ} 30'$ S., and its longitude $67^{\circ} 51'$ west of Greenwich. *From that point of the anticlinal line of the Cordillera which we call "Real (royal) de los Andes,"* the traveller no longer sees the plains of the "Salar" and basin of Atacama, and leaving them he descends to the territory which is improperly called the Puna de Atacama, lying between *the Cordillera which we have just mentioned (that of the Andes) and that which runs parallel to it at a distance of a degree and a half of longitude further east*, serving as the international boundary between the Republics of Bolivia and Argentina (the Cordillera Real de Bolivia).

"Between the two Cordilleras there run others parallel and connected with each other by their respective spurs or lateral ramifications, so that, from frequent crossings, there results a network or web of mountainous cordons between the points of intersection of which there are formed corresponding enclosed areas which constitute hydrographic basins, with their beds (fondos) or valleys (hondonadas) still occupied by water or by the salt deposits or argillaceous mud left by the evaporated water."

In the second volume of his work Señor San Roman is even more explicit as to the lateral extension of the Cordillera de los Andes; and his opinions respecting what he calls "*Cordillera Real de los Andes*," will suffice to show that the Argentine Expert was in the right when he proposed the dividing line on the high crests, *in the region to the north of 28° S. lat.*

Señor San Roman describes the Cordillera from north to south. After distinguishing the different ridges which precede it on the west—the Cordillera Darwin, the Cordillera Domeyko—after having mentioned the high plain Philippi, which separates the Cordillera Domeyko from the *Cordillera Real de los Andes*, he examines in detail the Cordillera de la Costa, the Cordillera Domeyko, and the *Cordillera de los Andes*. He says that the *Cordillera de los Andes* keeps its character as a single chain—that is to say, with only one line of crests or anticlinal axes—to the great mass of the Potro,* from which peak it makes a sharp turn, taking the direction of the summits of Cacerones, Come Caballo and Colorado de Pircas Negras.†

* Vol. 2, p. 412.—"The Cordillera de los Andes which, from the southern latitudes of Chile runs to the north between the meridians 75° and 74° west of Greenwich, and then obliquely to the east until it nears meridian 72° and parallel 34° S. lat., continues, from thence, to run in a true north direction, preserving, throughout its course, the character of a single chain, that is to say, of a single line of crests or anticlinal axes, until it reaches the solid block of the Potro, the highest summit of which corresponds with the intersection of the meridian $69^{\circ} 42' 10''$ west of Greenwich, with the parallel $28^{\circ} 17' 55''$ S."

† P. 413.—"From this remarkable height, the Potro, on the single cordon of the Andes (which until there preserves its general trend from the north to the south), the direction of the anticlinal axis of the Cordillera, makes an abrupt turn of $56^{\circ} 15'$ towards the east, forming its line as marked by the summits of *Cacerones, Come*

To the north of Pircas Negras, in the main chain, is the gap called Quebrada Seca. Señor San Roman prolongs the line to the mountains of Dos Hermanas, continuing the *Cordillera Real de los Andes* by Tres Quebradas, Patos and Cuesta Colorada, from which rises the River Lamas that cuts the ridge of Claudio Gay, near the eastern slope of which rise the volcanoes which have given the highest relief to that portion of the Cordillera.*

At the foot of Mount Tres Cruces there is a transversal depression, in reference to which Señor San Roman adds :—

P. 571.—“The *Cordon Real de los Andes*, that is to say, the 'boundary Cordillera, which, as the only and evident divisional cordon reaches the summit of Patos and Tres Cruces, is here interrupted in its longitudinal course to the north as to give passage to the streams which flow down from San Francisco, after which it bends abruptly to the east for about forty geographical miles, where it forms that imposing elevation.

“From this point the chain diverts, forming an elbow to the north west, and constituting the Cordillera, which through Buenaventura runs to the north, forming the line of heights that formerly divided the Argentine Republic from the Bolivian table-land of Antofagasta de la Sierra, which now belong either temporarily or permanently to Chile, and at the same time, defines towards the east, the *divortium aquarum* of the Argentine rivers.

P. 572.—“Now from the same Mount and Gap of San Francisco, in a direction

Caballo, and *Colorado de Pircas Negras* until the lofty quadrangular summit of *Monte Pissis* (1) the highest peak of which stands at 68° 48' 18" W. long. and 27° 45' 48" S. lat.”

* P. 413.—“If the line from the Potro to Mount Pissis be prolonged, following the above-mentioned direction of north 56° 15' east, this prolongation will form a tangent with the arc or elbow projecting to the east, which is determined by the summits of Curuto and Pasto de Ventura, situated in the angle formed by the eastern Cordillera of the Puna de Atacama in its bend to the north. However, if we trace the direction straight towards the block of Tres Cruces, through the prolongation of Quebrada Seca to Dos Hermanas, then this angle will be reduced to about 45°, always with the general bearings formed by the longitudinal valleys, and the axes of mountains, within the section which is being described.”

Referring to the River Lamas, Señor San Roman says :—“This chain (Claudio Gay, which is parallel to the line of the high crests), which is intersected by River Lamas, and which runs in its two branches, on both sides of this river at right angles to its course, which is from east to west, is not the Anticlinal Cordillera. However, the sources of the Lamas are only a short distance off to the east and north-east, at the foot of the Tres Cruces group, which consists of three summits in a line running from north to south, the first standing out in the Cordillera Real which, up to that point, has proceeded regularly and as a single chain, from the Dos Hermanas, through Tres Quebradas, Patos and Cuesta Colorada, and in an opposite direction to the north, where, at a very short distance, it sinks abruptly, forming an opening to the prolongation of the dry valley which takes the place of the River Lamas, and rising again by low elevations dividing into two arms, one of which runs to the west through the *Campo de Piedra Pomez* and the other to the east through *Barrancas Blancas*, until it reaches the volcanic Mount Wheelwright.”

(1) This is the only reference which will be made to Monte Pissis. Señor San Roman was labouring under an error when he made the crest of the Cordillera stand on this high mountain, formerly known under the name of Nacimiento del Jagüel. This high mountain forms part of the detached group to which Señor Bertrand refers, and is separated from the Cordillera de los Andes by the broad valley of Rio Salado.

opposite to the former—that is to say, to the north-west—the *great Cordillera* doubles on itself as far as the summit of Juncalito, returning to take the direction it had left, that of the Tres Cruces to the north, along the same general meridian in which the *Cordillera Real de los Andes* runs without interruption as far as the Licancaur.

“In this arrangement of the Andean orography, as it is easily understood, the *Great Cordillera* forms a deep entrance, an angle advancing towards the east, the apex of which is occupied by the group of San Francisco and the Lozas, and in these tablelands the same features are found as in some southern valleys and rivers of west Patagonia, such as the Aysen and others, only with the difference of the height, and the great elevations which appear in 27° S. lat. and determine there in such a lofty manner the continental ridge.”*

Referring to the alleged bend of the main chain of the Cordillera de los Andes, he has said :—

P. 429.—“This branch determines for the Argentine Republic the anticlinal line of crests and of the slopes down which the waters which incontestably belong to her from thence to the Atlantic run, the same unmistakable fact continuing to occur through the prolongation of the Cordillera of San Francisco itself, making another sudden and rapid bend to the east, through B. Ventura, Curuto, etc. *It certainly ceases to be the Cordillera Real, but it continues to be, for the Argentine Republic, the anticlinal line, and that of the eastern slopes.*”

It will be observed that Señor San Roman, in this assertion, sets aside the international agreement according to which the Cordillera de los Andes is to constitute the only boundary between Chile and the Argentine Republic. His declarations will show to the Tribunal the Chilian persistency in modifying the letter of the Treaty of 1881, the Protocol of 1893, the Agreement of 1896, and, at the same time, the confusion which is made between the longitudinal chains and the “isolated mountains” which rise among them.

Señor San Roman also says :—

P. 426.—“In the meantime the prolongation of the Cordillera de los Andes, which from Tres Cruces to Wheelwright had not ceased to be such, but which is no longer the real anticlinal between the Pacific and the Atlantic, between the Chilian and Argentine Republics, the water-parting, the *divortium aquarum*, etc., has been interrupted in the same manner as it is from Tres Cruces to Colorado, through the interposition of the same depression, which advances towards the east until its origin in San Francisco.

“The volcano Wheelwright lifts its highest peak in the rarefied atmosphere of these heights in 26° 49' 14" 88''' S. lat., and 68° 44' 44", 54''' long. west of Greenwich, and in

* With the difference that on the east of the Aysen there are no mountains of any kind, but only the Patagonian plains.

order to complete this detail of the course of the Andes it may be stated that these mountains run from Wheelwright towards the east until they reach the great cordon of San Francisco, which we will shortly describe, and that they form there an abrupt angle, and then recede to the west and take their former direction, close to Claudio Gay branch, in the summit of Juncalito, giving passage through the deep cutting which exists there to the torrential river of the same name, the origin of which we have already indicated."

It is necessary to bear in mind that "Andes" and "Cordillera de los Andes" are terms used by Señor San Roman with quite different meanings. By "Andes" he means both the eastern and western chains and the groups of intermediate mountains; by "Cordillera de los Andes" he means the western range. He then says :—

P. 427.—"From Juncalito, *the main and well-defined Cordillera de los Andes* continues through Piedra Parada, Laguna Brava, Nevados de Aguas Calientes, Volcan Lastarria, Llullayllaco, Socompa, Miñiques, etc., as far as the pyramidal Licancaur, the bulwark and watch-tower of the aborigines of Atacama, with its peak of cinders, its crater filled with snow, and the mysterious relics of the early existence of man over a rock of volcanic glass, covered with eternal snow at 6000 metres (19,686 feet) above the level of the sea."

P. 429.—"From what has been described, it is clearly demonstrated: first, that the *Real Cordillera de los Andes*, though considerably depressed at the foot of the Tres Cruces, nevertheless follows its continuous *though irregular* course, through San Francisco, Wheelwright, or rather directly towards Juncalito, etc., or along a more prominent chain, which runs to Colorado; and secondly, that from the group of Tres Cruces, a colossal ridge **detaches itself perpendicularly to the course of the Andes*, and then turns back in the form of a horse-shoe to unite with the Andes again."

Señor San Roman is in error, when he speaks of an "interruption" to the north of the "Cerro Tres Cruces," as is shown by his own words. He admits that the *Cordillera de los Andes does not join with Mount San Francisco*, but notwithstanding this, he says that "the branch (which passes by that mountain) determines for the Argentine Republic the anticlinal line of crests."

In another part of his book, he adds :—

P. 708.—"The great Cordillera, from Licancaur to Llullaillaco and Volcano Lastarria, runs to the south with the same majestic loftiness, through the Nevados Aguas Calientes, Laguna Brava and Juncalito, from whence it continues at a lesser altitude by the cordon of Claudio Gay or by some other to the east of this, through Wheelwright, until it reaches in

* There is no such a mountain ridge, as will be ascertained by the surveyors to be appointed by the Arbitrator. There are only to be found detached mountains which bound the ancient valley between the "Cordillera de los Andes" and the "Cordillera de Bolivia," on the edge of a very ancient plateau.

its symmetrical or orographic prolongation the group of Tres Cruces through the opening of San Francisco, but it is bound and completely united *in its hydrographical character to the pass and mountain of the same name*, which has given rise to such unfounded apprehensions."

It has been said and repeated that Mount San Francisco is not situated in the Cordillera de los Andes, and therefore the hydrographic character which serves Señor San Roman as a reason for tracing the boundary line through this mountain, does not solve the dispute with regard to the correctness of the location of the landmark in the northern gap.

In the opinion of Señor San Roman, the Pass of San Francisco, where the disputed landmark was fixed, is situated *very far out of the highest edge of the Andes* : * whereas, according to his own statements, which have been already quoted, the *great Cordillera de los Andes passes* to the west, by the cordon of Claudio Gay, or by some other to the east of this, and through Mount Wheelwright, until it reaches the group of Tres Cruces, across the "opening of San Francisco," *which forms the orographic prolongation of the Cordillera de los Andes between the two points, according to Señor San Roman.*

Therefore the landmark planted in San Francisco gap is not, according to Señor San Roman's description, in the Cordillera de los Andes. This is a fundamental point in this section of the boundary question. As to the other considerations of this geographer, it must be repeated that the limit between Chile and the Argentine Republic is determined by *the most elevated crests of the Cordillera de los Andes*, and not by the highest summits of the *general system of the Andes*, dividing the Continental waters, and separating *the Chilian and Argentine slopes of the Pacific and the Atlantic.*

The Argentine Government has never accepted any other basis than that of the Cordillera de los Andes. *The expression "general system of the Andes" is a vague one*, which can only be properly used to convey an idea of the western mountains of South America, as apart from the mountains of Brazil, and which has nothing to do with the divergences between the Experts of the Argentine Republic and Chile, with regard to the placing of landmarks in the main chain of the Cordillera de los Andes.

* Señor San Roman says :—P. 694.—" We have carefully condensed, in the preceding lines, all that refers to our object of clearing up the geographic position, and we completely agree with the Professor (Reclus), and confirm his opinion, which is the same which we have expressed for a long time past, viz. that *the pass of San Francisco, where the disputed landmark was placed*, is *very far out of the highest edge of the Andes*, but we must add, that it is, nevertheless, the highest summit of the general system of the Andes, which divides the continental waters, and separates the Chilian and Argentine slopes of the Pacific and the Atlantic."

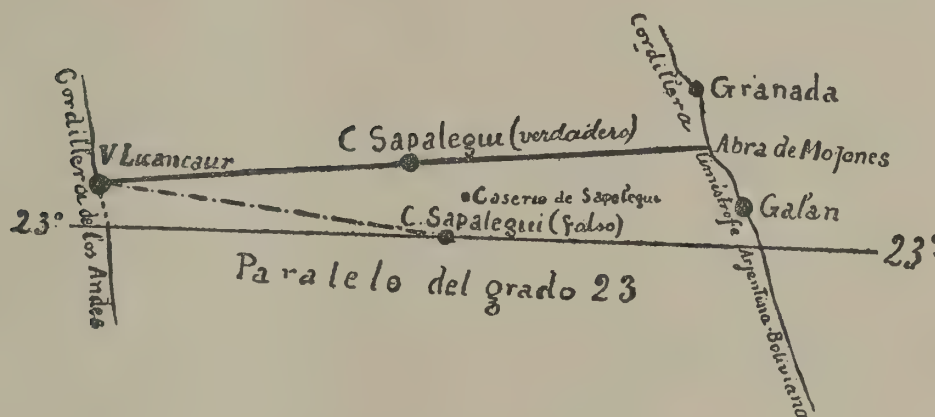
The line described by Señor San Roman, as the true and only Cordillera de los Andes, is the one chosen by the Argentine Expert to fix (in accordance with the existing Treaties) the boundary marks between Mounts Juncal or Wheelwright and Tres Cruces.

The accompanying facsimile of a sketch by Señor San Roman proves once more that, according to this geographer, *only the western range is to be considered as the Cordillera de los Andes.*

4. If the opinions of Señores Bertrand and San Roman were not sufficient, there could also be adduced that of Señor Santiago Muñoz, a very competent

PUNA DE ATACAMA

EL LIMITE DEFINIDO POR EL PACTO DE TREGUA I EL LIMITE IDEADO PARA LA
CELEBRACION DEL PACTO ARGENTINO-BOLIVIANO.



FRANCISCO J. SAN ROMAN, 1895.

(From Estudios y datos prácticos sobre las Cuestiones Internacionales de límites entre Chile, Bolivia y República Argentina, Santiago, 1895.)

engineer who accompanied Señor San Roman in a great part of his surveys. Señor Muñoz is the author of a geographical description of the Provinces of Atacama and Antofagasta.

In treating of the hydrographic basins* he distinguishes the basins of the

* Speaking of the basin of Chamaca and Rio Negro, he says that it is bounded on the west and south-west by the summits of Puntas Negras, Aguas Calientes, Chiliques, Lejia, Socaire, Tumbres, Laskar, Aguas Calientes, as far as Mount Hecar, and adds that all these are summits of the high Cordillera de los Andes. Geografica descriptiva de los provincias de Atacama y Antofagasta, Santiago 1895, p. 33.

coast originating in the Cordillera de la Costa, the basins of the desert, which descend from the first western ridge of the "*Cordillera de los Andes*," or "*Cordillera Domeyko*," and the basins of the "*Cordilleras properly so-called*."

When he deals with the basin of Atacama, he says that it is bounded on the east from the Volcano Tatio, on the north as far as the Volcano Socompa, on the south by the high Cordillera, determined, amongst others, by the intermediary summits of Licancaur, Toco, Putas, Pótor, Colachi, Aguas Calientes, Laskar, Tumbres, Negro de Socaire, Lejía, Chiliques, Puntas Negras, Miscanti, Cápur, Coranzoque, Pular and Pajonales (p. 27).

Referring to this high Cordillera de los Andes, which he clearly distinguishes from the other five Cordilleras mentioned by him, he adds :—

P. 51.—"If we draw a straight line between the summits of Licancaur and Potro, we shall see that the intermediate points are almost on this line from which they deviate but slightly, sometimes in the eastern and sometimes in the western direction, so that the line mentioned indicates the true course of this Cordillera, which is that of N. $15^{\circ} 45'$ east of the true meridian."

All the preceding demonstrations, under the irrefragable authority of the Government of Chile, and her most competent geographers, show that the Cordillera de los Andes, between 23° and 28° S. lat., is perfectly defined ; that this Cordillera is enclosed to the west, by the Cordilleras Domeyko and Darwin, and to the east by a high plateau interspersed with groups of isolated mountains forming basins without outlets, and which spreads until the prolongation of the Cordillera Real ; that the principal chain, the highest crest of the Cordillera de los Andes is prolonged in a regular direction, forming a true range visible in all its length to which Mount San Francisco does not belong. In consequence, the dividing landmark, which, owing to an imperfect survey, was erroneously placed at the foot of that mountain in 1892, and which was not approved by the Experts, as has been stated, does not form part of the international boundary line, as it was declared by Article 5 of the Agreement signed by the two Governments in April 1896.

This chain, known as the main Cordillera de los Andes, divides the waters of its highest crest ; it agrees with the conditions stipulated for in the Treaties of 1881 and 1893, and is in harmony with the Agreement of 1896.

It has been, therefore, clearly established :—

1. That the Chilean Government recognised as the Cordillera de los Andes, to the north of 27° S. lat., the same Cordillera considered as such by geographers,

that is to say, the chain which on the west borders the high Bolivian plateau (now Argentine) and which contains the summits of Licancaur, Tonar, Pular, and "Yuyayaco" according to the Commissioners Pissis and Mujia, and the summits of Vizcachillas, Jorjencal, Puripica, Licancaur, Pótor, Hécar, Láskar, Tumisa, Miñiques, Pular, Socompa, Llullaillaco, Azufre, &c., according to Señor Bertrand, who gives to this succession of summits the name of "Cordon Andino" (Andean cordon).

2. That to the east of the *Cordillera de los Andes* there are groups of mountains which are separated from the Andean chain and are all isolated : among these rise the isolated Mounts Zapaleri, Lina, Rincon, Pocitos, Antofalla, Mojones, Laguna Brava, *San Francisco* and Peinado, in the country which Señor Bertrand calls Puna de Atacama, and which spreads, as already said, until the "Cordillera Real of Bolivia."

3. That the boundary along *the highest crests* having been clearly agreed to, especially in the Argentine-Chilian and Argentine-Bolivian Treaties of 1893, and in the Agreement of 1896, the Argentine Expert's interpretation of the Treaty of 1881 is confirmed by those Covenants.

4. That the annulment of the landmark planted in San Francisco Gap, further indicates that it was wrongly placed, as the Argentine Experts had always contended.

4. THE CORDILLERA DE LOS ANDES ON THE NORTH ACCORDING TO SEVERAL AUTHORITIES.

The western branch of the Cordillera de los Andes, formed by what the Chilian geographers call Cordillera Darwin and Cordillera Domeyko, was considered for a long time as forming the eastern Chilian boundary. Up to 1884 all maps depicted the frontier line within it. The large official map of Chile drawn up by Señor Amado Pissis may serve as a decisive example.*

The travellers who visited the region between 23° and 28° S. lat. held as the true Cordillera de los Andes the chain bordering on the west the high plateau of the Puna de Atacama. Plate XXVIII. is a reproduction of the maps by Doctor Petermann, drawn in accordance with the data gathered by

* Plano topográfico y geológico de la República de Chile, levantado por orden del Gobierno, bajo la dirección de A. Pissis, Paris, 1875.

Doctor R. A. Philippi during his travels from November 1853 to February 1854.* In them, the name Cordillera de los Andes is applied to the western range of the Puna, where the Tumisa, Miñiques, Pular, Socompa, Llullaillaco, etc., rise. The same is to be observed in the map accompanying Doctor J. J. Von Tschudi's Report on his journey across de Puna de Atacama,† as is shown in Plate XXIX.

Doctor Hermann Burmeister, whose opinion is so highly respected by the Chilian Representative, illustrates one of his books with a map, the pertinent part of which is here inserted. The principal ridge of the Cordillera de los Andes is depicted in it with the name of "la linea" (the line), as forming the watershed; and Mount San Francisco is given in its true position, near the intermediate chain.

Doctor A. Petermann in his Mapa Original de la República Argentina etc., indicates the same range as the Cordillera de los Andes, and in the intermediate chain is placed the pass of San Francisco (Plate XXX.).

Mr. E. A. Flint, in his "map of a proposed line of railway across the Andes, from Caldera to Fiambalá,"‡ gives the name of the Andes to the chain of Las Llamas, to the west of San Francisco pass.

The "Atlas de la Confédération Argentine" by Dr. Martin de Moussy § contains (Sheet XV.) the boundary in the Cordillera as Pissis indicated it, showing Mount San Francisco in its exact position to the east of the range; and between this mountain and the ridge of Maricunga, or "Cordillera Domeyko," Dr. Moussy has drawn the true Cordillera with the name of "*central cordons of the Cordillera de los Andes*," placing Mount Tres Cruces among them.

In 1884, Señor Alejandro Bertrand tried to modify the boundary line, deviating it as far as the pass of San Francisco, as did also Señores Francisco J. San Roman and Santiago Muñoz, who described the boundary between Chile and the Argentine Republic as cutting transversally the longitudinal ridge to the east of the Cordillera de los Andes and prolonging it along the Cordillera Real de Bolivia. ||

Nevertheless, after that date, Señor Brackebusch, whose opinions the

* Petermann's Geographische Mittheilungen, 1856.

† Ibid, 1860.

‡ Proposed railway route across the Andes, Royal Geographical Society, 1860. § Paris, 1869.

|| This supposed boundary has been entirely set aside by the resolution dated March 23, 1899, of the Argentine-Chilian delegates, Señores José E. Uriburu and Henrique MacIver, and Mr. W. Buchanan, Plenipotentiary Minister of the United States of America. According to this resolution the boundary, for a considerable distance, has been definitely marked out in the Cordillera de los Andes.

Petermann's Geographische Mittheilungen.

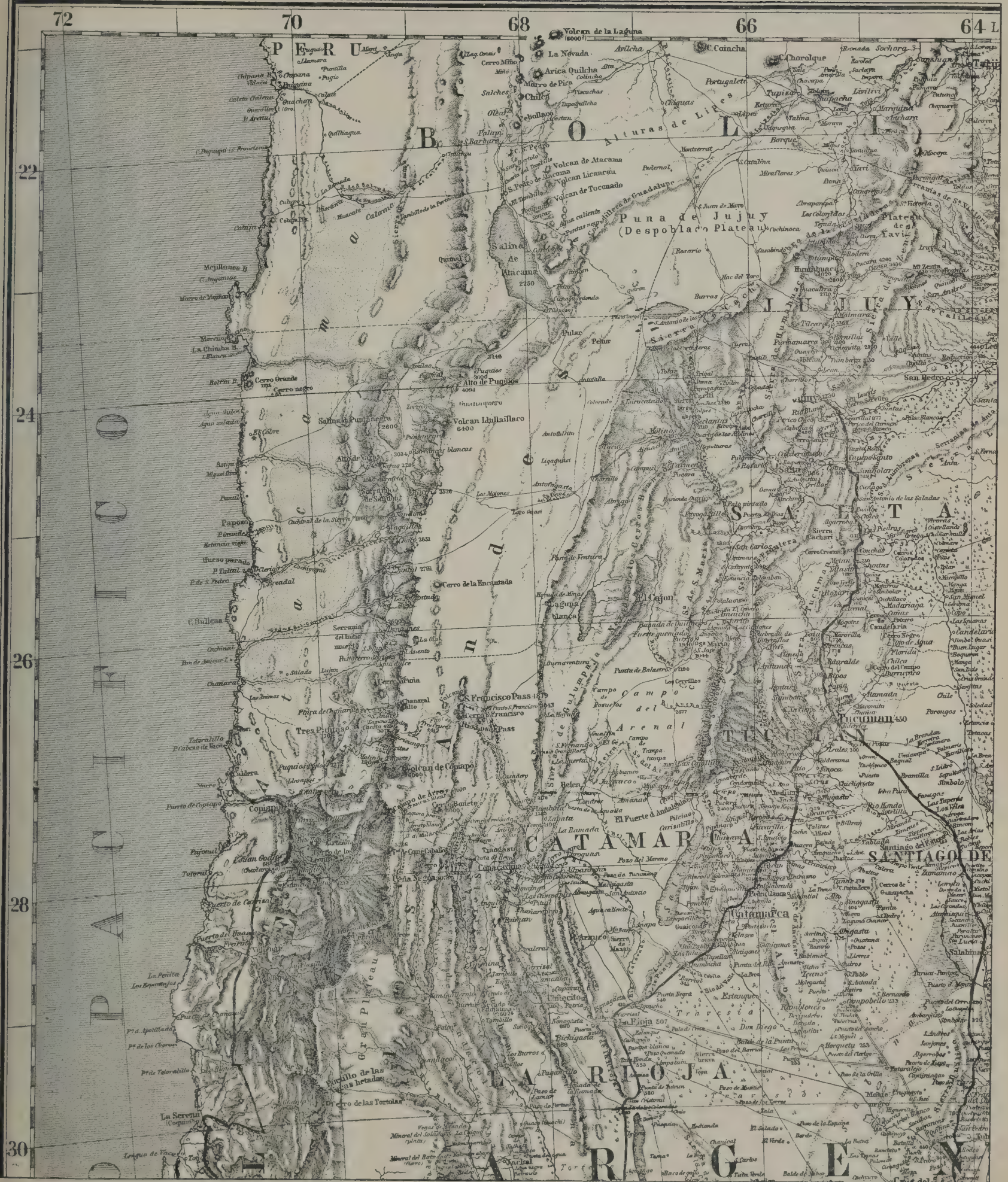
Tafel 4 u. 5.

Jahrgang 1856 Tafel 3



GOTHA: JUSTUS PERTHES
1858

Lith. Anst. v. C. Hoffmann in Göttingen



FROM MAPA ORIGINAL DE LA REPUBLICA ARGENTINA, ETC.

[Face p. 608.]

Dr. A. Petermann. Gotha, Justus Perthes, 1875. (Reproduced by permission.)



HERMANN BURMEISTER, 1861.

(From Reise durch die La Plata—Staaten, etc., Halle.)

Chilian Representative highly estimates, in the first edition* of his map of the Argentine Republic, marks the Argentine-Chilian Boundary in the same

* Mapa del Interior de la República Argentina, Gotha, 1885.

ridge in which Pissis places it, that is, in the "Cordilleras Darwin and Domeyko" of Señor San Roman ; and in the second edition * he does not make any alteration in that part, since he only indicates as "disputed by Chile," the section between Mounts San Francisco, Bravo and Azufre, which, notwithstanding that indication, he includes in the territory of the Argentine province of Catamarca, though erroneously assigning to Chile the northern portion of the Puna de Atacama.

Dr. Brackebusch depicts the same boundary in other maps published in 1893. †

The true *Cordillera de los Andes*, well known to the north of 25° S. lat., after the explorations of Señores Pissis, Mujía, Philippi and Bertrand, was at that time not thoroughly surveyed to the south of that parallel. However, in the region crossed by the roads of San Francisco and Tres Cruces, between Copiapó and Tinogasta, merchants and travellers were sufficiently acquainted with the two Cordilleras. The Cordillera Domeyko was known to them as "Cordillera de los Chilenos" and that of the Andes in Tres Cruces as "Cordillera de los Argentinos." Chile worked the mineral wealth of the salt deposits (salares) of Pedernales and Maricunga situated at the eastern foot of the Cordillera Domeyko, in the depression which separates it from that of the Andes, having constructed industrial establishments and also wagon roads across the *Cordillera de los Chilenos* by the Gap of Maricunga or Santa Rosa. This region was generally considered as belonging to Chile, and her occupation of it was not protested against by the Argentine Republic at the time when the demarcation of the boundary in the Cordillera de los Andes was begun.

5. PROJECTS OF THE EXPERTS RELATING TO THE BOUNDARY LINE FROM 23° TO 26° 52' 45" S. LAT.

An old boundary dispute was still pending between the Argentine Republic and Bolivia when Chile and Bolivia signed the Treaty of truce in 1884, agreeing thereby that the provisional jurisdiction of Chile to the north-east should be determined by a straight line which, starting from Zapaleri, at the intersection

* Mapa de la República Argentina, etc., Gotha, 1891.

† Höhengschichten-Karte des nordwestlichen Teiles der Argentinischen Republik, Petermann's Mitteil., vol. 39, 1893. Physiographische Karte, in the same volume.

with the boundary which separates Bolivia from the Argentine Republic, should reach the Licancaur Volcano.

Zapaleri and Licancaur are situated a little to the north of 23° S. lat. The Treaty of truce was silent regarding the territories south of said parallel, and was therefore silent regarding the Puna de Atacama.

As a consequence of the war of 1879 between Chile and Bolivia, Chile occupied the region to the west of the Cordillera de los Andes and to the south of parallel 23°, but not an inch of the region to the east of the Cordillera was pretended by Chile, so much so as the Puna, lying in that region, was at that time under discussion between the Argentine Republic and Bolivia. Chile had acknowledged more than once that her eastern boundary in the Puna de Atacama* as anywhere else, was constituted by the high summits of the Cordillera de los Andes, and had therefore, no reason to interfere in the Argentine-Bolivian controversy, which in no way affected her interests.

Like most questions connected with boundaries in South America the eastern and western limits of the Puna were unsettled in some points during many years. The land is inhospitable, unsuitable for agriculture or for pasture, and if not impossible, at least very unfavourable for habitation. The temporary neglect to occupy these regions was due also to the scantiness of the population of the countries which laid claim to them, and to the fact that their principal centres were at a considerable distance from the high plateau and without frequent communication with it. The Argentine Republic, for these reasons, possessed only a few data concerning this region, but she considered such lack of information of small importance, as she felt quite certain about the final result of her frontier negotiations with Bolivia.

In the meantime, Chile occupied for quarantine purposes some insignificant places in the Puna de Atacama, and enacted the law of July 12, 1888, creating the province of Antofagasta. This Act was, of course, of a provisional character, as it was controlled by the pending boundary Convention between Bolivia and the Argentine Republic.

The Act indicated as the boundary to the east, the same which Bolivia maintained to be her true frontier with the Argentine Republic, and which corresponds with the line of high crests of the *Cordillera Real de Bolivia*; and to the south, the volcanoes and their lavas and ashes which lie on the high plateau,

* See pp. 95 to 100, 102, 388 to 393, etc.

from Pasto Ventura as far as their intersection with the crest of *the Cordillera de los Andes*. This Act, besides, is a proof of the lack of geographical knowledge concerning the mountains where the line was supposed to run. Article 1, for instance, says that the province of Antofagasta has, for its eastern boundary, the intersection of the line which unites the summits of Licancaur and Zapaleri with the western limit of the Argentine Republic, and *then the line of the limit as far as the highest summit of Mount San Francisco*. Nevertheless Mount San Francisco has only one summit : it never was considered as a frontier point between Bolivia and the Argentine Republic, nor between the latter and Chile ; and it is well-known that the international road, from Copiapó to the north-western Argentine provinces, passes to the north of this mountain.

The lengthy negotiations between Argentina and Bolivia terminated with the Agreement of 1893, which determined as the western Argentine boundary from parallel 23° southward, the anticlinal line of the Andes, or the profile of the Cordilleras, or, in fact, the high crests of the Cordillera de los Andes. It was then clearly stated that all that zone lying to the east of this mountain edge was Argentine. The territories which, by the mentioned Act of 1888, had been declared under Chilean jurisdiction, and which are situated *to the east of the line of high crests of the Cordillera de los Andes, and to the south of parallel 23°*, remained therefore under the Argentine dominion, and so it was recognised by the Chilean Government themselves, when in the Agreement of 1896 they stated that the boundary line in the Cordillera de los Andes should be traced as far as parallel 23°.

Notwithstanding this, the line of the eastern Cordillera (i.e. the Cordillera Real de Bolivia) is the one which, as previously mentioned, Señor Barros Arana chose in proposing the Chilean-Argentine boundary, contrary to all that had been stipulated between the two nations. He afterwards supported his proposal by enumerating the principal summits, up to the vicinity of Mount San Francisco, of the same line which had formed the provisional Argentine and Bolivian frontier previous to 1893, thus confining himself to upholding a purely political frontier, and studiously avoiding any reference to the geographical conditions of the country, as they were diametrically opposed to his definition of the term "main chain of the Andes," and to the views he advocated with regard to the watershed.

It has been already stated (page 365) that Señor Moreno based his proposed line on all the reliable antecedents of the controversy. He defined that line in these terms :—

"The general boundary line between 23° and $26^{\circ} 52' 45''$ S. lat. which he now proposes, is wholly situated in the main range of the Cordillera de los Andes, constituted in said part of the same Cordillera by the line of the highest crests which actually exists, and which 'separated Chile from the high tableland or Puna Boliviana de Atacama' and constituted the traditional boundary, as declared by the Chilian Expert to my predecessor, the Expert of the Argentine Republic, Don Octavio Pico, in his note of January 18, 1892.

"This general line shall start from the point in which parallel 23° S. lat. crosses the edge or culminating line which separates the slopes of the main chain of the Cordillera de los Andes, which in that part is the 'Real Cordillera de los Andes,' and the 'high Cordillera de los Andes' according to the Chilian engineers Don Francisco San Roman, and Don Santiago Muñoz.

"From this point southward, it shall pass by the edge (No. 1 of the Argentine map) which from mount Tonar, Tocar, Tenar or Toco, lying to the north of said parallel extends to mount Honar (4) passing between the mounts Niño and Putana or Puta (2 and 3) lying to the east and a nameless volcano of symmetrical form, mounts Áspero, Bordos Colorados and at some distance from mounts Zarzo and Zapata, all lying to the west.

"From the Honar the line shall continue along the edge or crest as far as mount Potor (5), opening of Potor (6), mount Colache (7), mount Abra Grande (8), mount Volcan (9), Barrial (10), Lejía (11), Overo (12), Agua Caliente (13), mount Puntas Negras to the south of Agua Caliente (14), rising ground near Laguna Verde (15), mount Miñiques (16), Puntas Negras (17), mount Cozor (18), Media Luna de Cozor (19), mount Capur (20), mount Cobos (21), ridge from Capur to the opening of Pular, Punto 4740 (22), thence by the crest to mount Pular (23), point 4780 (24), mount Salina (25), rising ground of the east of Socompa Opening 4380 (26), rising ground near Del Oeste (27), mount Socompa (28), point 4240 (29), mount Socompa Carpis (30), mount Tecar (31), principal point of the range of mountains between Tecar and mount Inca (31 to 35), mount Inca (36), opening Zorra Vieja, 4440 (37), mount Llullaillaco (38), gap of Llullaillaco, 4920 (39), Corrida de Cori (40), Volcano Azufre or Lastarria (41), range del Azufre or Lastarria up to mount Bayo of same (42 to 47), point 4970 (48), mount Agua de la Falda (49), mount Agua Blanca (50), mount Parinas (51), mount Morado (52), mount del Medio (53), mount Peinado Falso (54), point XXVI. (55), point 5134 (56), mount Laguna Brava (57), mount Juncalito I. (58), Juncalito II. (59), Juncal or Wheelwright (60), Pirca de Indio at the foot of Juncal or Wheelwright (61)."

As the Tribunal will see, the Argentine Expert, founding his proposal on the special researches carried out on the ground by the Boundary Commission, as well as on its general conclusions, proposed the points which, according to Señores Pissis, Mujia, Bertrand, San Roman and Muñoz, characterise the Cordillera de los Andes (the "cordon de los Andes," of Señor Alejandro Bertrand), in the same range considered as such by the Governments of Bolivia and Chile in their Protocol of 1872 and in their Treaty of 1874, and by the Chilian Expert in his reply to the Argentine Expert, Señor Pico, of January 18, 1892.

The Chilian Expert did not oppose his colleague's conclusions with reasons

of an international character. He only took into account the domestic Chilian disposition of July 12, 1888, and on this basis he completely disregarded the Agreements in force. He considered himself restricted, as already said (p. 368), by the Chilian internal acts; but he did not think that the Chilian external Treaties were also laws; that they were compulsory: and that he, as an Expert, was compelled to comply with their clauses. He defined his line as follows:—

“Point of intersection of parallel 23° S. lat. with the range of Incahuasi, mount Pucas or Peñas, river Las Burras (point at ten kilometres, approximately, from Susques), Cortadera gap (road from Susques to Cobre), mount Trancas, wide gap of Pasto Chico, mount Negro, to the east of mount Tuler or Tugli, Chorrillos wide gap, Colorada wide gap (road from Pastos Grandes to San Antonio de los Cobres), Del Mojon opening, Las Pircas opening (road from Pastos Grandes to Poma), mount La Capilla, mount Ciénaga Grande (to the north of the snow-capped peak Cachi), La Cortadera or Del Tolar opening (road from Pastos Grandes to Molinos), mount Juere Grande, Las Cuevas opening (road to Encrucijada), opening of Cerro Blanco, mount Blanco, mount Gordo, mount Agua Caliente, snow-capped peak Diamante or Mecara (mount Leon Muerto), Vicuñorco gap, snow-capped peaks Laguna Blanca, Pasto de Ventura gap, mounts Curruto, mount Azul, Robledo gap, mounts Robledo, San Buenaventura gap, snow-capped peak Negro Muerto, mount Bertrand, Dos Conos (two cones), cone Falso Azufre, San Francisco gap.”

The Argentine Expert answered in the form stated at page 369, and declared that the line proposed by the Chilian Expert was a *political*, and not a *geographical line*, such as that which they were entrusted to draw should be, and besides, that it was *outside the Cordillera de los Andes*, to which the Treaties and Agreements refer.

The Chilian Expert had been appointed in 1890 to trace, on behalf of his country, the dividing line in the Cordillera de los Andes, within which the boundary must exist; in 1896 the Chilian and Argentine Governments agreed to prolong that boundary in the Cordillera de los Andes as far as 23° S. lat., and ordered their Experts to fix the landmarks therein; however, in 1898, the Chilian Expert, proceeding against the course ordered by his Government, proposed to the Argentine Expert a line so completely extraneous to the *Cordillera de los Andes*, that any reference to it was carefully avoided, and considerations foreign to the matter entrusted to him were only put forth. The Chilian Expert considered that the eastern boundary of Chile was, up to 1879, the highest crests of the Cordillera of the Andes, in the part of the desert of Atacama “where there really and actually existed a line of high crests, which separated Chile from the high plateau, or Puna Boliviana de Atacama,” a region in which there is a

complicated ramification of the *divortium aquarum*, so that, as an exception, where the waters belonging to the plateau do not flow into the ocean, it was thought safer to designate the high crests, which presented no ambiguity, and consecrated the traditional limit. Nevertheless that traditional boundary between Chile and Bolivia, referred to by Señor Barros Arana in his note to the former Argentine Expert, Señor Pico, *no longer existed*, according to his explanations in the Record of September 3, 1898. However, Señor Barros Arana added :—

“That he acknowledges that if the boundary which before that epoch separated Chile from the Bolivian Puna, say the western limit of the territory that went under said name, were now to be fixed, the line indicated (by the Argentine Expert) would scarcely deviate from the one the undersigned would lay down in the greater part of its extent.”

Since the Chilian Government had agreed in 1896 to the marking out of the boundary line in the Cordillera de los Andes, between $26^{\circ} 52' 45''$ and 23° S. lat., Señor Barros Arana should have obeyed that mandate, accepting, in the greater part of its extent, the line which the Argentine Expert proposed to him, since it corresponded with the former boundary between Chile and Bolivia, as acknowledged by Señor Bertrand. For the Chilian Government, besides, there could not exist any other Cordillera de los Andes than that which they had recognised as such in the Protocol of 1872, and in the Treaty of 1874, that is to say, that which contained the traditional boundary which separated Chile from the Bolivian Puna.

Señor Barros Arana carefully avoided the mention of the “Cordillera de los Andes” in tracing his line between 23° and $26^{\circ} 52' 45''$ S. lat., and it is well that the Tribunal should be made acquainted with some facts which may explain his reason for doing so.

The first difference between the Experts submitted to the Government of Her Britannic Majesty, relates to the landmark in the pass of San Francisco, in the latitude in which the two Argentine and Chilian lines before mentioned terminate. The San Francisco landmark is the consequence of Señor Barros Arana's error in considering the Chilian Act of 1888, as having paramount importance over international Treaties. The San Francisco landmark cannot, therefore, be taken into consideration.

**6. THE RANGE POINTED OUT BY THE CHILIAN EXPERT FROM
23° TO 26° 52' 45" S. LAT. IS INTERSECTED BY RIVERS.**

It has been already said that the Cordillera Real de Bolivia bounds, on the east, the Puna of Atacama and that it is intersected by rivers. It will suffice to lay before the Tribunal only the Chilian authorities which indicate those gorges through which the waters of the basins situated at the foot of the two slopes of that Cordillera drain in opposite directions,—cases which are similar to those of Rivers Mapiri and de la Paz, described by Sir Martin Conway. The map of Señor Bertrand* depicts within the territory claimed by Chile all the upper course of the River Burras, and indicates the western Argentine boundary as following the peaks of the Cordillera Real, called "Cerro Granadas," "Cerro Galan," "Cerro Incahuasi," and from there by the summit of Pucas to the lofty peaks of the Nevado de Cachi, the altitude of which is given as 6000 metres (19,686 feet).

This line cuts the course of two arms of the River Burras which run across the Cordillera Real. That in 1884 Señor Bertrand was thoroughly convinced that rivers should be cut by the boundary line, is evinced, not only in the case of River Burras, but in another which occurs to the south of it, and which is depicted as intersecting what he calls the "limit with the Argentine Republic," as is shown in the part of his map here reproduced. Though Señor Bertrand has described in his book the basins of the Puna de Atacama, he omits that of the River Burras, but referring to Señor Brackebusch, says that according to this author—

"The River Burras which rises in the Cordilleras of Susques and Rosario in Bolivia, belonging to the basin of Guayatayo in the province of Jujuy (Argentine Republic) forms, in its continuation, the boundary with Salta (between that province and that of Jujuy), issues near the Cerro Negro de la Sierra, and enters the lagoon to the east of Rinconadilla."

Thus it was possible, according to Señor Bertrand, for the Cordillera Real to divide a basin in two parts.

Señor Bertrand's views are shared in this point by Señor San Roman. In his map, published in 1890 by the Department of Public works of Chile, which contains the geographical results of the exploring party in the "Desierto de

* Mapa de las Cordilleras en el Desierto de Atacama y regiones adyacentes, 1884.

Atacama,"* may be seen, correctly traced in the two reproductions here inserted, the afore-mentioned River Burras intersecting the Cordillera Real, between "Cerro de Pucas" and the crest of "San Antonio de los Cobres"; and lower down the "Rio de los Patos" intersecting the said Cordillera Real between "Cerro Gordo" and "Sierra del Agua Caliente." In his book "*Estudios y datos prácticos sobre las cuestiones internacionales de límites entre Chile, Bolivia y República Argentina*"† are to be found some interesting passages. This book, which contains some articles published by Señor San Roman in Chilean newspapers since 1893, reproduces one entitled "The International Boundaries between Chile, the Argentine Republic, and Bolivia" (1893), in which, referring to the Chilean-Argentine Treaty and the natural boundaries, he says:—

P. 11.—"If, nevertheless, it is preferred to rectify the boundary, taking for it the shortest line, the orographic configuration offers, almost without exception, the case of a deep pass, ("boquete") of a unique gorge, or other clearly indicated feature ("accidente,"), which receives all the scattered and converging waters of the hydrographic basin which transgresses the general law. If such is the case, as in fact it is, in the basin of Susques, which drains through the pass of "Las Burras" in the province of Salta, the solution is found, as there, by the simple prolongation of the line of crests which divides the waters in the heights of the intersected cordon, but though this natural case is frequent there is no reason to apply it to the international agreement except for extreme necessity or for reciprocal convenience.

"There the line of watershed, the continuous hydrographic boundary, is abandoned because the local peculiarity presents an easy and tangible means of adjusting a frontier line through a convention and an international agreement expressly called into existence by an exceptional case, which makes no law nor does violence to the fundamental topographic principle, which determines the continuous course of a natural division. An act of nature would thus be modified without any consequent disavowal or negation of its immutable laws."

In the same article Señor San Roman presents a "Summary of the superficial extent of the hydrographic basins of the Cordilleras of Atacama and Antofagasta," and he gives that of Susques as 3422 square kilometres, and that of Ratones as 4057·06 kilometres on the Chilean side, and 509·47 on the Argentine. The book is also accompanied by a reduction of part of the map

* Carta Geográfica del Desierto y Cordilleras de Atacama, compiled by the exploring party of Atacama. Francisco J. San Roman, Engineer in Chief; Santiago Muñoz, Assistant Engineer, in 4 sheets; Santiago, 1890. A second edition came out in 1892.

† Santiago de Chile, 1895.

published in 1890 and 1892, in which are to be seen the intersections of the *Cordillera Real*, by the rivers Susques or Burras and Patos.*

Thus, according to Señor San Roman, the basins of the rivers Burras or Susques and Patos were Chilean in the part situated towards the west of the western slope of the "*line of crests which divides the waters in the heights of the intersected cordon*," and Argentine in the part lying to the east of the eastern slope. The system which Señor San Roman indicates for dividing the waters in the Cordillera is exactly the one established by the Treaty of 1881, the one followed everywhere by the Argentine Expert, and the one objected to by Señor Barros Arana, the Chilean Expert.

This interesting observation, as well as the whole Article in which it is contained, have been suppressed in Señor San Roman's voluminous work "*Desierto y Cordilleras de Atacama*," published in Santiago de Chile in 1896, though all the remainder of his first book has been reproduced in it. The extent of the basin of Susques has also been omitted; as to that of Ratones, a description is given, but without specifying the extent of both of its sections on one side and the other of the Cordillera Real.

Nevertheless, when dealing with this latter basin, he says:—

P. 556.—"It is bounded on the north by Pastos Grandes, and extends *on the east as far as the Argentine frontier Cordillera, which, as at Susques, though in an opposite direction to the course of the waters*,—since in this case they do not run out of the Puna, but flow into it,—cuts through the basin, *so as to leave part of it on one side of the Cordillera and part on the other side*, that of the Argentine side being of no great extent.

"Thus, the boundaries of the basin are: on the north from Copalayo to Juere Grande, on the east, the Argentine Cordillera from Juere Grande to Cerro Blanco, Aguas Calientes, Nevado del *Diamante* and Mecara, on the south the heights of Diamante, from Cancha Argoya to Hombre Muerto, and on the west Falda Ciénaga, heights of Incahuasi and the series of mounts bordering the saltland along Gallegos, Tolar Grande, Chuculai, Belquebil and Copalayo. . . . As an important river, that of Patos is noteworthy, *having its source in the Cordillera, in Argentine territory*, and receiving the thermal waters of 'Aguas Calientes'; its sources are in the Diamante, with two principal affluents, the 'Ojo Grande,' and the 'Ojo Chico,' where the hot springs exist." †

Speaking of the basin of the Susques, he says:—

* This book was printed after a favourable report of the Chilean Expert, Señor Barros Arana, but it had a very restricted circulation, and the greatest part of the edition was reserved. It would appear that the reason for its being kept back was the insertion of that article, which has not been reproduced in the more extensive work of Señor San Roman, printed in 1896.

† *Desierto y Cordilleras de Atacama*, etc., vol. ii.

Vol. I., p. 252.—“About the middle of the same month of May, the assistant Muñoz had pitched his tent at the other side of a ridge which runs to the east of ‘Siberia,’ in a grassy plain called Pastos Chicos, which belongs to the basin of the river Susques, at the foot of the Cordillera which forms the boundary of the Argentine Republic. This Cordillera, running north and south, in continuation of the uninterrupted general course of the geographical boundary of the Puna, *there undergoes one of these accidents which introduce irregularity and exception, being broken in a deep fissure, and being cut through by waters, since those flowing from Pastos Chicos as well as all those flowing from Susques, are tributaries of the river which has the name of Las Burras, and which enters Argentine territory.* Geographically, or naturally, we were then among Argentine waters, but as the political boundary, between the contiguous Republics—Bolivia and Argentina—had not observed that difference, we were, according to the Treaties and the facts in the Bolivian territory ceded to Chile, *the orographic and not the hydrographic Cordillera being that which divided them, its regular and continuous line of elevations being followed in preference to the irregular and tortuous, though always visible and clear course of the heights of the divortium aquarum.*”*

Señor Santiago Muñoz, the fellow-worker of Señor San Roman, in his already mentioned *Geografía descriptiva de las provincias de Atacama y Antofagasta*—which has likewise been withdrawn from circulation, probably for the same reasons which caused Señor San Roman’s first work to be kept back—says :

P. 30.—*Basin of Susques* :—“The general direction of this basin is from north to south, and it is comprised between the Argentine boundary ridge from Cerro Incahuasi, as far as that of Cerro Negro, and the cordon of parallel “Cerros” which runs along the summits of Lares or Bávaro, Hornillos and Morado.

“It contains the river Susques, which takes its rise in the southern slope of the Lares or Bávaro mountain, following its course towards the east, and *passing through a narrow gorge, like a deep ditch,* between the summits of Pucas and San Antonio de los Cobres, *runs into the Argentine Republic,* in which territory it takes the name of Rio de las Burras, and then empties itself into the Argentine lagoon of Guayatayo.

“The river Susques has two affluents : the Pastos Chicos, which rises in the Túzler and Morado mountains, flows from south to north, passes through the plains of Pastos Chicos, 3883 metres (12,740 feet) above the sea, and then joins the Susques near the village of the same name ; and the Coranzol or Morait, which rises on the north of the Cerro Incahuasi, and joins the Susques a little lower down than the afore-named village. Extent, 342,259 hectares.”

Referring to the basin of Ratones, Señor Muñoz, says :—

P. 36.—“This basin is situated to the south of that of Pastos Grandes and *borders on the Argentine Republic towards the east, being partly in one country and partly in the other, for*

* These territories are now Argentine, as decided by the Commissioners appointed to settle the question.

which reason we will take into account the Chilian section, both with regard to its boundary, and to its superficial extent, leaving the Argentine Section to be dealt with later on. Its boundaries are: on the north the ridge of Cerros Copalaye and Juere Grande; on the east the international frontier-line with Argentina, which, starting from the last-mentioned point, passes over the Cerro Blanco, Cerro Gordo, the low ridge of Aguas Calientes, and Nevado del Diamante or Mecara;”

He adds that the river Patos “takes its rise in Argentine territory,” and falls into the “Salar de Ratones.” In his opinion the “boundary Cordillera” is continuous between the points of *Cavalonga* and *Portezuelo de San Buena Ventura*. He says:—

P. 52.—“*Cordillera of the Boundary with Argentina*:—This is the last longitudinal cordillera towards the east, and is determined by the following summits: *Cavalonga*, *Incahuasi*, *Pucas*, *San Antonio de los Cobres*, *Trancas*, *Cerro Negro*, *Portezuelo de Chorrillos*, 4215 metres (13,825 feet), *Capilla*, *Ciénega Grande*, 6364 metres (20,877 feet), *Juere Grande*, 5655 metres (18,554 feet), *Cerro Blanco*, *Portezuelo de Vicuñorco*, *Laguna Blanca*, 5579 metres (18,305 feet), and *Portezuelo de San Buena Ventura*, 3680 metres (12,074 feet).

“The general trend of this line is $10^{\circ} 15'$ N. to the east, with regard to the astronomical meridian. This Cordillera, as also the preceding one, contains some summits which rise to great heights, and are separated from each other by low ridges of some length. Its shape is continuous between the points mentioned, being, in this respect, different from the two others.”

As it is between “*Cavalonga*” and “*Portezuelo de San Buena Ventura*” that the intersections of the rivers *Susques* and *Patos* occur, it is evident, in the opinion of Señor Muñoz, an engineer who has personally studied the ground, that these intersections do not interrupt the continuity of the chain.

Señor San Roman shares the same opinion, since in his last book, referring to the alleged spur of the Cordillera de los Andes, which branching out at Mount Tres Cruces, continues as far as San Francisco, in the opposite direction, and then to Mount Juncal or Wheelwright, he states:—

Vol. I., p. 429.—“*This branch determines for the Argentine Republic, the anticlinal line of crests and of the slopes down which the waters which incontestably belong to her, from thence to the Atlantic, run*: the same unmistakable fact continuing to occur through the prolongation of the Cordillera of San Francisco itself, making another sudden and rapid bend to the east, through *Buena Ventura*, *Curuto*, etc. It certainly ceases to be the Cordillera Real, but it continues to be, for the Argentine Republic, the anticlinal line, and that of the eastern slopes.”

Señor San Roman, in his Article of 1893, considered it possible to prolong the frontier through the “line of crests which divides the waters in the heights of the

intersected cordon" (by the river Burras), and afterwards he added that this line was "for the Argentine Republic, the anticlinal line, and that of the eastern slopes."

It is well to bear in mind the opinions of two such competent geographers as Señores San Roman and Muñoz, although the Argentine Expert does not agree with what they say about the basin of San Francisco.

According to Señor San Roman, the Cordillera Real de los Andes, when it lowers at the foot of "Tres Cruces" "does not cease to be such, but it is no longer the real anticlinal between the Pacific and the Atlantic, between the Chilean and the Argentine Republics, the water-parting, the *divortium aquarum*," &c. (p. 426, vol. II.).

If the eastern Cordillera, or "Cordillera Real de Bolivia" is anticlinal, dividing the waters, and continuous according to Señor San Roman and Señor Muñoz, in spite of its intersection by the rivers Susques and Patos, why should not the *Cordillera de los Andes* be so likewise, in spite of the transversal depression between Mounts Tres Cruces and Wheelwright, where it is not intersected by any river, and forms an isolated basin, such as those described by Señores Bertrand, San Roman, and Muñoz? These geographers consider as being a Pacific basin that of Laguna Verde, to the east of Mounts Tres Cruces and Wheelwright; why, then, did not they say that the basin of the Susques is an Atlantic basin? To proceed thus, they would have been amply justified, since this last basin, though an "abnormal" one, has a real outlet, whilst the other is enclosed by the ridge of Pirca de Indios, where the Argentine Expert proposed to place a boundary mark.

No doubt these contradictions were borne in mind when the above mentioned books of Señores San Roman and Muñoz were kept back from circulation. These books created a difficulty in the way of the Chilean Expert, in order to maintain his interpretation of the words "main chain of the Andes," and even a greater obstacle to the solving, in the manner he wished, of the question of the landmark at the gap of San Francisco.

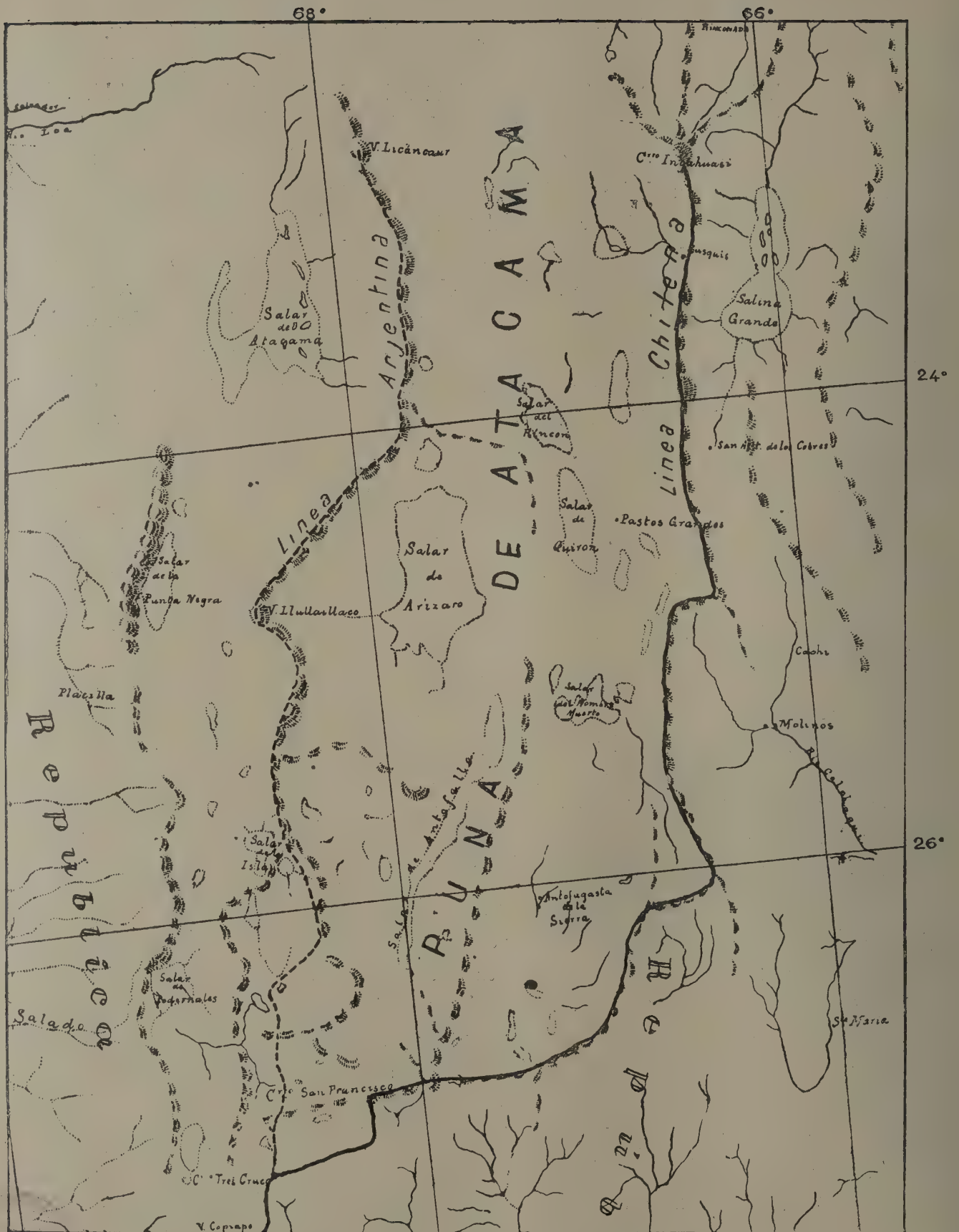
Though in the Records he omitted the words "Cordillera de los Andes," he retained the term "main chain of the Andes," which term is, notwithstanding, dependent on those words, and he retained also the phrase "the highest crests of the Andes which divide the waters." He imagined that the difficulty he encountered in carrying out the letter and the spirit of the Treaty of 1881, the Protocol of 1893, and the Agreement of 1896, would be overcome by indicating to the Argentine Expert the Cordillera Real de Bolivia, as if it were the

principal chain of the Cordillera de los Andes, but he forgot that he had himself explained in his *Geografía Física* the distinction between the two Cordilleras, and also that the Treaty of 1866, the Record of 1870, the Protocol of 1872 and the Treaty of 1874, and the opinions of Señores Bertrand, San Roman and Muñoz were all of them diametrically opposed to his contentions. Señores San Roman and Muñoz, exploring engineers highly reputed in their country, consider as continuous what they call the anticlinal chain dividing the waters between "*the Argentine Republic and Chile*," from 23° to 27° S. lat., and this assertion would have considerably endangered his theory on the *continental divide and on the main chain of the Andes* which, according to him, were synonymous terms, since they say that this chain continues to be anticlinal, though it is intersected by waters running in opposite directions.

Perhaps this insurmountable difficulty caused Señor Barros Arana to depart from the Treaty, and propose to the Argentine Expert, not a boundary in the "*Cordillera de los Andes*," as ordered in his instructions, but a political boundary, based upon a domestic Chilean law. Nevertheless, he could not do otherwise than follow, in a great extent, the Cordillera Real de Bolivia, when he thus described the line: point of intersection of parallel 23° S. with the ridge of Incahuasi, his Mount Pucas or Peñas, las *Burras River* (at a point *approximately ten kilometres from Susques*) the opening of Cortadera (road from Susques to Cobre) Mount Trancas, Mount Ciénega Grande, Mount Juere Grande, Mount Blanco, *Mount Gordo*, *Mount Aguas Calientes*, and the snow-capped peak of *Diamante or Mecara*, etc. *Therefore, he drew his line intersecting the rivers Burras and Patos.*

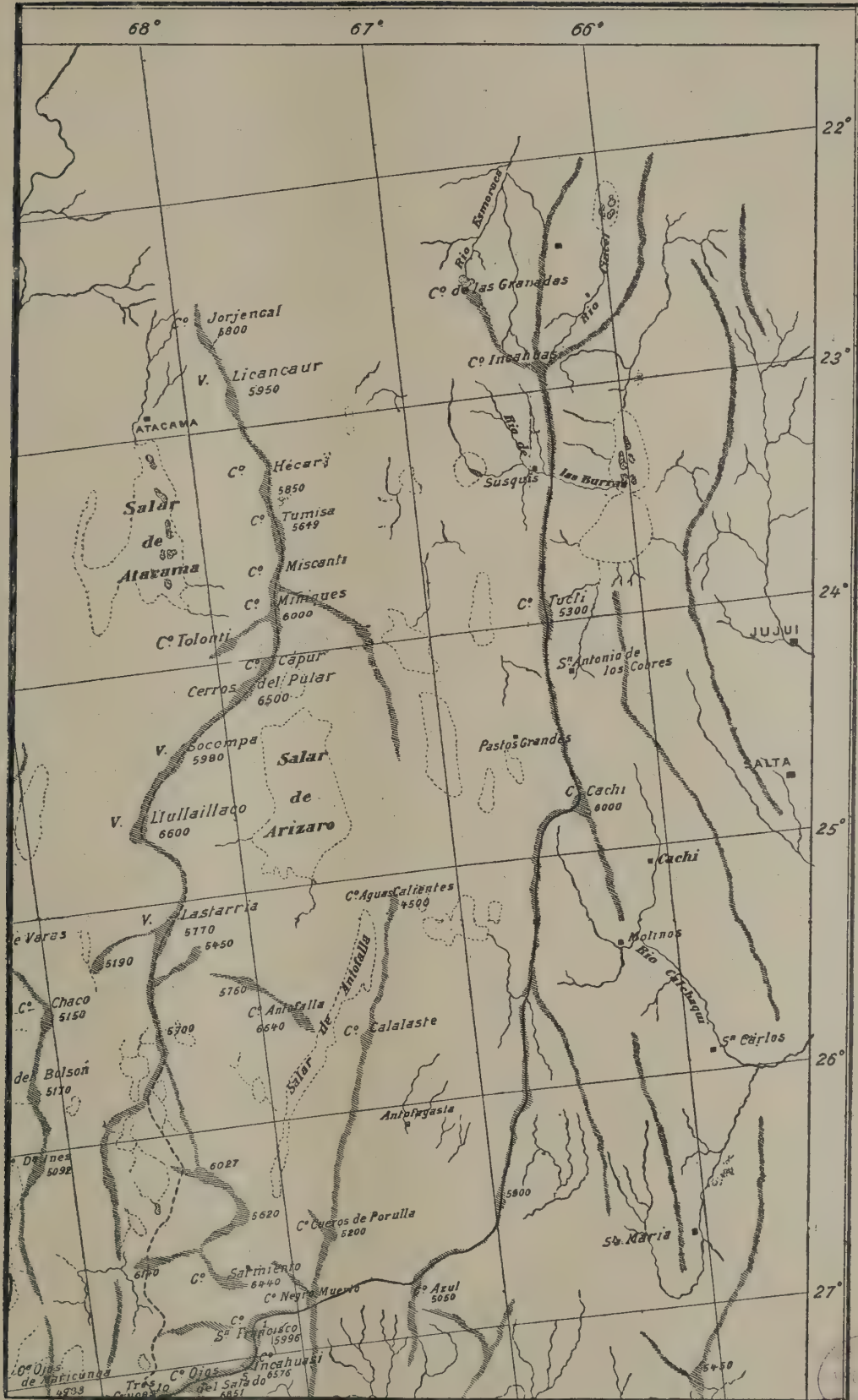
In Chapter XVI. two Chilean printed official maps of this region have been quoted which are contradictory to each other. In the first one, published by the Chilean Expert, the course of river Susques, or Las Burras, does not cut the chain, but terminates before arriving at it from the west, and thus the boundary line does not cross the river; as to the part where the line must cut the river Los Patos—according to the enumeration made by Señor Barros Arana of the landmarks from Mount Gordo to Mount Aguas Calientes,—this line has been pushed to the east so as to leave, in what was claimed as Chilean territory, all the river.

In the second map, which was issued after the resignation of Señor Barros Arana as Chilean Expert, the boundary line cuts the two rivers. In order to facilitate the comparison between these maps, their pertinent parts are here inserted in fac-simile. It has also been pointed out that in the map on scale



DIEGO BARROS ARANA, CHILIAN EXPERT, 1898.

(From La Cuestión de límites entre Chile y la República Argentina, Santiago, 1898.)



MAP OF THE CHILIAN BOUNDARY COMMISSION, 1898.

(From *Demarcación de límites entre Chile y la República Argentina*, Santiago, 1898.)

1 : 1,000,000 submitted to Her Britannic Majesty's Government, the boundary line proposed by the Chilian Expert has not been traced according to the Record of September 3, 1898.

The attention of the Tribunal is called to this substantial contradiction :—

1. In the printed map of the Chilian Boundary Commission, *the line is intersected by both rivers Burras and Patos.*

2. In the map on a scale 1 : 1,000,000, *the line is not intersected by the river Patos.*

3. In the map of Señor Barros Arana the line *is not intersected by either of the two rivers.*

7. THE DEFINITIVE MARKING OUT OF THE BOUNDARY LINE FROM 23° TO 26° 52' 45" S. LAT.

These long explanations, which chiefly refer to regions, the boundary of which has not been submitted to Her Britannic Majesty's Government, have been unavoidable, not only because they have a direct bearing upon the divergence concerning Nos. 1 and 2 of the Argentine, and Nos. 1 to 8 of the Chilian line, but also because they clearly show the attitude of the Chilian Expert, during the long discussions with regard to the frontier, and prove the inconsistency of his views, making at the same time apparent the means he employed to maintain them, thus complicating what would have been an easy and rapid operation if conducted according to the letter and spirit of the Treaties. The difficulties which arose between the Experts when projecting the demarcation of the frontier, in the Cordillera de los Andes, from 23° to 26° 52' 45" S. lat. have been already removed; but it is desirable that the Tribunal should know the proceedings followed to settle the matter, because some of the official opinions expressed on that occasion completely exclude those of the Chilian Expert in reference to the application of the Treaties.

Five delegates acting for each country, assembled in the City of Buenos Aires, in March 1898. Those representing the Argentine Republic were Señores Mitre and Uriburu, ex-Presidents of the Republic, Señor Yrigoyen, Minister for Foreign Affairs during the negotiations of 1876 and 1881, and Señores Victorica and Romero, ex-Ministers of State; and the Chilian delegates were Señores Altamirano, MacIver, Matte, Zegers and Pereira—influential statesmen and leaders of the Chilian political parties.

In the second meeting of the Conference, the Chilian delegate, Señor Altamirano, proposed to trace the boundary along the line specified in the Record of September 3, 1898, that is to say, exactly the same as it had been projected by Señor Barros Arana ; but when he did so he erroneously considered that this line corresponded with the Cordillera de los Andes, and that it was in accordance with the terms of Article 1 of the Agreement of 1896 which states :—

“The operations of the demarcation of the boundary between the Argentine Republic and the Republic of Chile, which are being carried out conformably with the Treaty of 1881 and the Protocol of 1893 shall extend, in the *Cordillera de los Andes*, as far as parallel 23° S. lat.”

The Chilian delegation thus modified the proceedings or rather the reasons given by Señor Barros Arana, as they upheld the pretended old Argentine and Bolivian boundary as located in the Cordillera de los Andes and thereby they tried to carry out the letter of the Treaties.

According to the Chilian delegation, the *highest crests of the Cordillera which separates the waters*, viz. : the principal chain of the Andes, were formed by the Cordillera Real de Bolivia, which contains Mounts Incahuasi, Pucas, Ranquel, Cachi, Juere Grande, Blanco, Gordo, Aguas Calientes, Nevado del Diamante, or Mecara, Nevado de Laguna Blanca, Mounts Pircas, Alegre, etc., and by the intermediary mountain summits between the true Cordillera de los Andes and that of Bolivia, viz. : Curuto, Azul, Robledo, Negro Muerto, and Cerro Azufre, up to the north of San Francisco Gap. In consequence, the line proposed by the Chilian delegates passes between the slopes which descend on both sides of those mountains, INTERSECTING THE RIVERS BURRAS, AND PATOS, which (as has already been stated) cut through the backbone of the chain.

The Chilian delegates adopted the same proceedings as the Government of Bolivia when defending the frontier line, in this chain, during the negotiations with the Argentine Republic ; and they, besides, entirely agreed with the Article 1 of the Protocol of 1893, which orders the intersection of rivers, when these rivers cut through the highest crests of the Cordillera de los Andes which may divide the waters.

The Argentine delegate, Señor Yrigoyen, proposed, in substitution of that suggested by Señor Altamirano, the line in the Cordillera de los Andes which contains the Cerros Licancaur, Honar, Potor, Lascar, Aguas Calientes, Miñiques, Capur, Pular, Salinas, Socompa, Tecar, Llullaillaco, Azufre, Bayo, Agua Blanca,

Morado, Peinado Falso, Laguna Brava, Juncalito, Juncal or Wheelwright, and Tres Cruces, that is to say, the line proposed by the Argentine Expert, Señor Moreno, in the Record of September 1, 1898.

The Chilean delegates, in reporting to their Government on the meetings held at Buenos Aires, stated that the Argentine delegates had maintained the line proposed by the Expert Señor Moreno, affirming at the conference of March 3—

“1. That the Record of November 2, 1898, which establishes the powers of the Conference, and the Agreement of April 17, 1896, to which the Record refers, ordain that the dividing line must be traced in the Cordillera de los Andes; that this Cordillera is the western cordon which starts from Licancaur to the south: because geographers have always understood it to be so; because that is the historical and traditional boundary line of Chile; and because it was the limit between Chile and Bolivia marked out in 1870 by Pissis and Mujia.

“2. That the cordon of Licancaur being the limit between Chile and Bolivia, the Puna de Atacama, which is to the east of that cordon, belonged entirely to Bolivia, and that this Republic having ceded the Puna to Argentina by the Treaties of 1889 and 1893, the whole of the said territory is Argentine property.

“3. That Chile was not the owner of the Puna before 1879, nor has she acquired dominion over it since that date, because she has not made any declaration in such a sense with the assent of Bolivia, nor does she hold anything else than a *de facto* tenancy, subordinate and dependent on what the Treaty of peace or an express agreement between Chile and Bolivia may determine.

“4. That the delegation called upon to trace the line in the Cordillera de los Andes, ought to trace it in the cordon of Licancaur, the only cordon constituting that Cordillera, and had no power to trace the line elsewhere, nor to pronounce upon the dominion over the Puna, nor to divide it, because they had not the powers of an Arbitrator.

“The Chilean delegation maintained that the dividing line ought to be traced in the eastern cordon of the Cordillera de los Andes, starting from Incahuasi to the south.

“They alleged as reasons:—

“1. *That the Cordillera de los Andes, within which the dividing line ought necessarily to be traced*, is not only the western cordon of Licancaur, but likewise the eastern cordon which starts from Incahuasi to the south, the central cordon which starts from the environs of Zapaleri to the south, and all the “*cerros*” and valleys which exist between the cordons of Incahuasi and of Licancaur; that this mass of “*cerros*” and cordons which join, bifurcate, or are isolated, form the great Cordillera which runs from north to south over the whole of America; and that, if it is right and usual to designate with special names, its diverse sections, it would not be so to segregate any portion of them, because they are in reality a mass of mountains known by all geographers under the name of Cordillera de los Andes.

“2. That if the Records had only established that the dividing line ought to be traced in the Cordillera de los Andes, the line in the eastern cordon of Incahuasi would be correct,

as this cordon is a part of the said *Cordillera* and combines the conditions of height, continuity of elevated summits and division of waters contemplated in the Treaties.

"3. That the Record of November 2 establishing both that the line should be traced in the Cordillera and that for that tracing all the documents and antecedents relating to it should be taken into account, the line must be marked out in the cordon of Incahuasi, which would leave the Puna in possession of Chile, as it is to-day, the tracing in the cordon of Licancaur being unacceptable, since it would give the contrary result."

Further on, referring to the meeting of March 8, they say :—

"Having met together on the said day, the Argentine delegation put forward, by way of a basis of agreement, the line that they called "Pissis Mujia," which is that of the Expert Señor Moreno, or of Licancaur, from parallel 23° as far as 25° 40' S. lat., and they declared that from this point to the south, an equitable line might be sought.

"As this proposal amounted to the abandonment on the part of Chile of nearly the whole of the Puna, we declared that we did not consider it useful as a basis for discussion.

"On our part, we proposed as a compromise the line which, starting from the Nevado de San Pedro, near Zapaleri, would pass along the central cordon of the Puna, following its greatest altitudes, which measure 5700 metres (18,701 feet), 5200 (17,061), 5450 (17,880), 5600 (18,374), 4500 (14,764), 5350 (17,553), 5870 (19,259), and 6480 metres (21,260 feet).

"This line, which took into account the Argentine view of tracing the limit by the highest summits, and the Chilean view of tracing it in the *divortia aquarum*, was more justified than that of the Expert, Señor Moreno, whose greatest altitudes are, according to the Record of the second Meeting 4740 metres (15,551 feet), 4780 (15,682), 4380 (14,370), 4240 (13,911), 4440 (14,567), 4920 (16,142), 4970 (16,306), 4997 (16,395) and 5134 metres (16,844 feet).*

"Our proposal was nevertheless, very coldly looked upon by the Argentine delegation.

"The resistance to tracing a conciliatory and equitable line having thus been shown

* The Chilean delegate was in error when comparing the altitudes of the central cordon of La Puna, to which he gives the following:—5700 metres (18,701 feet), 5200 (17,061), 5450 (17,880), 5600 (18,374), 4500 (14,764), 5350 (17,553), 5870 (19,259), and 6480 metres (21,260 feet), with those of the line proposed by the Argentine Expert, who places on record the following:—4740 metres (15,551 feet), 4780 (15,682), 4380 (14,370), 4240 (13,911), 4920 (16,142), 4970 (16,306), 4997 (16,395), and 5134 metres (16,844 feet). These heights solely refer to gaps or low points, without names, and have only been given as points of reference in the Argentine map. The principal altitudes of the "cerros" mentioned in the Argentine proposal are the following:—Licancaur, 6000 metres (19,685 feet), Tonar, 5620 (18,439), Putana, 5230 (17,159), Potor, 5500 (18,045), Colache, 5670 (18,603), Abra Grande, 6150 (20,178), Lascar, 5870 (19,259), Tumiza, 5670 (18,602), Ipira, 5600 (18,373), Miñiques, 5900 (19,357), Capur, 5280 (17,258), Pular, 6340 (20,800), Socompa, 6080 (19,948), Carpis, 5370 (17,618), Tecar, 5590 (18,340), Inca, 5500 (18,045), Llullaillaco, 6620 (21,720), Agua Caliente, 5250 (17,225), Azufre, 5680 (18,636), Mount Bayo, 5300 (17,389), Mount Agua de la Falda, 5470 (17,947), Mount del Medio, 5380 (17,651), Peinado Falso, 5700 (18,701), Mount Colorado, 5840 (19,160), Vallecito, 6060 (19,882), Mount Lagunas Bravas, 5338 (17,513), and 5420 (17,782), Juncalito 5950 (19,521), Sierra Nevada, 6100 (20,013), Mortero, 5924 (19,436), Juncal or Wheelwright, 5813 metres (19,072 feet).

Consequently the comparison between the two lines favours that of the Argentine Expert.

in all its clearness, it was agreed that the second conference should be held on the following day, Thursday, March 9.

"At this second conference, Señor Altamirano in the chair, the proceedings commenced by stating the points agreed upon at the last private meeting.

"Señor Altamirano proposed the line of Incahuasi, which passes from north to south over the eastern cordon, perhaps *the highest of the Cordillera de los Andes*.

"Señor Yrigoyen proposed the line which, starting from Licancaur, follows the western cordon of the Cordillera de los Andes, which is not, according to the maps that we had before us, the highest of that Cordillera.

"Both proposals being considered in succession were not accepted by an equal number of votes."

The assertion of the Chilean delegates that the Cordillera Real de Bolivia belongs to the Cordillera de los Andes, is the outcome of an error, as is shown by the numerous authorities already quoted, and especially the Chilean geographers, Pissis, Barros Arana, Bertrand, San Roman, Muñoz, etc. If it were necessary to adduce another opinion, that of Colonel Boonen Rivera, Head of the Chilean Intelligence Department, could be quoted.* In fact he says:—

P. 37.—"*Tarapacá*, bounded on the north, by the ravine and river Camarones from its source in the Andes down to its mouth in the Pacific, which separates it from the Province of Tacna; *on the east by the Cordillera de los Andes, which separates it from Bolivia*; on the south by the ravine and river Loa, from its mouth to the town of Quillagua inclusive, and thence by a straight line which, passing over the volcanos Miño, Túa and Olca, goes as far as the Bolivian frontier; on the west, the Pacific."

It would suffice to compare these lines with those drawn on the maps of Chile by Señores Bertrand and San Roman, to see that the Cordillera de los Andes, the Bolivian boundary therein mentioned, is the same as the range where are situated Lullaillaco, Licancaur, Tres Cruces, etc., which leaves on the east the Bolivian Province of Lipez. The pretension of the Chilean delegates at Buenos Aires could not aim but at a vindication of the Chilean Expert, accused of having proposed, on that part of the boundary, a line outside the Cordillera de los Andes.

Leaving aside this error, the Chilean delegates faithfully interpreted the Treaty of 1881 and the Protocol of 1893, in declaring that the line over the summit of the main chain of the Andes, which to their mind was the "EASTERN CORDON" OF INCAHUASI, WOULD BE CORRECT BECAUSE IT COMBINES

* Ensayo sobre la Geografía Militar de Chile, por J. Boonen Rivera, Santiago, 1897.

THE CONDITIONS OF HEIGHT, CONTINUITY OF ELEVATED SUMMITS AND DIVISION OF WATERS CONTEMPLATED IN THE TREATIES. Therefore, they considered that all those conditions were combined in a cordon or ridge which is cut by the rivers Burras and Patos—facts which the delegates knew, since they mention in the minutes the river Burras and also Mounts Gordo and Agua Caliente, between which the river de los Patos runs. Besides, they could not be unaware of the Chilian geographical works, more than once quoted in this chapter. In Colonel Boonen Rivera's book it is said :—

P. 176.—“River *Susques*, the principal stream in this basin, takes its source at the southern slope of Mount Lares, and runs from west to east, *until it penetrates in Argentine territory through a narrow gorge*, between the summits of Pucas and San Antonio de los Cobres. *When in Argentine territory*, it is called River *Burras*, and empties into Lake Guayatayo.”

P. 179.—“The ‘Salar Ratonés’ measures 88,653 hectares, and emptying into it from the west is the River Patos, *which rises in Argentine territory*, and which, near Mount Gordo, joins with River Aguas Calientes, formed by two arms, respectively called ‘Ojo Grande’ and ‘Ojo Chico.’”

Had the Chilian Expert proceeded as the high representatives of his country did at the conferences in Buenos Aires, there would not exist the questions submitted to Her Britannic Majesty's Government, because, from Pirca de Indios to the south as far as 52° S. lat., the main chain of the Andes, as it has been considered by the Argentine Expert, “combines the conditions of height, continuity of elevated summits, and division of waters contemplated in the Treaties,” and when rivers cut across it the cases are similar to those of the rivers Burras and Patos.

The Chilian jurisdiction to the east of the Andean crest, or that of Argentina to the west, would have been a source of continual difficulties between the two countries. On the other hand, the frontier upon high crests, and across precipices and torrents answers the requirements of a good and efficient frontier.

As the two delegations could not agree in tracing the line from 23° to 26° 52' 45" S. lat., the question was submitted, as it has been stipulated, to a Commission, composed of one delegate for each country, and Mr. William Buchanan, the United States Minister at Buenos Aires—that is to say, of two Experts, *ad hoc*, and a third as provided for in Article 1 of the Treaty of 1881. The Commissioners, Señores Uriburu, MacIver, and Buchanan soon determined upon the boundary line.

The Commission began their labours by addressing a note to the Governments of the Argentine Republic and of Chile, asking whether the point of intersection of the parallel $26^{\circ} 52' 45''$ with the line to be decided upon, was submitted at the same time to the Government of Her Britannic Majesty, and to the demarcating Commission. They also requested that the said Governments should come to an understanding as to which of the maps presented by them to the Commission should serve to trace on it the boundary line.

The Argentine Government replied that they understood that the parallel $26^{\circ} 52' 45''$ was the northern limit of the points submitted to Her Britannic Majesty's Government, and that the demarcating Commission was to draw the dividing line between the said parallel and that of 23° S. lat., at its intersection with the Cordillera de los Andes.

The Chilian Government stated on their part that Her Britannic Majesty's Government should fix a line from parallel $26^{\circ} 52' 45''$ to the south, and that the Commission should draw the line from the said parallel towards the north. They also said that it was very possible that Her Britannic Majesty's Government might fix a starting point different from that decided on by the Commission, and that should this be the case, the parallel $26^{\circ} 52' 45''$ would unite the starting points of the lines.

At a meeting of the special Experts on March 24, Señor José E. Uriburu, the Argentine Representative, proposed the dividing line along the same points indicated by the Expert Señor Moreno, that is to say, along the Cordillera de los Andes, from its intersection with parallel 23° as far as "Pirca de Indios" at the foot of Mount Wheelwright in the neighbourhood of parallel $26^{\circ} 52' 45''$.

Señor MacIver, the Chilian Representative, proposed the same line as the Chilian Expert, Señor Barros Arana. These proposals having been considered, the former was rejected by the votes of Señores Buchanan and MacIver and the latter by the votes of Señores Buchanan and Uriburu. Mr. Buchanan then proposed a dividing line which, starting from the intersection of parallel 23° with the meridian 67° long. West of Greenwich, should follow in a straight line up to the summit of Mount Rincon; a proposal which was accepted by Señor MacIver. Mr. Buchanan then proposed to continue the boundary from the summit of Mount Rincon in another straight line up to the summit of the Volcano Socompa; and Señor MacIver, instead of this, projected one which starting from the summit of Mount Rincon would reach to Mount Macon. These proposals having been considered, that of Señor MacIver was rejected

and that of Mr. Buchanan approved. The latter then proposed that the dividing line should run from the Socompa Volcano to the place called Aguas Blancas in the Argentine maps, along the points called Socompa Volcano, a point marked No. 29 in the proposal of the Expert Señor Moreno made to Señor Barros Arana, Mount Socompa Carpis, Mount Tecar, the principal point in the line of mountains between Tecar and Cerro Inca, Mount Inca, Mount de la Zorra Vieja, Mount Llullaillaco, Gap of Llullaillaco, a point marked No. 39 in the aforesaid proposal, "Corrida de Cori," the Azufre or Lastarria Volcano, ridge of Azufre or Lastarria to Mount Bayo, point to the south of Mount Bayo, No. 48 in the said proposal, Mount del Agua de la Falda, Mount Aguas Blancas. This line was approved, Señor MacIver dissenting. As a continuation of the frontier line, Mr. Buchanan proposed a straight line which, starting from the summit of Mount Aguas Blancas should reach the summit of Mounts Colorados, and which was accepted, against the vote of Señor Uriburu. Mr. Buchanan then proposed another straight line from the summit of Mounts Colorados to that of Mounts Lagunas Bravas, and it was approved, Señor MacIver dissenting. As a continuation, Mr. Buchanan projected another straight line from the summit of Mounts Lagunas Bravas to the summit of the so-called Sierra Nevada in the Argentine map, and reckoned in that map to have an altitude of 6400 metres (20,998 feet), which was accepted, Señor MacIver dissenting. Finally there was proposed by Mr. Buchanan and accepted by Señores Uriburu and MacIver, a straight line which, starting from the point last indicated, should reach the point to be fixed in parallel $26^{\circ} 52' 45''$ by Her Britannic Majesty's Government.

If the line traced by the three Experts *ad hoc* is compared with those respectively proposed by the Experts Señores Barros Arana and Moreno, it will be seen that, *while not a single point of those indicated by Señor Barros Arana* has been accepted, the definite boundary follows, after starting from the Socompa Volcano, the true Cordillera de los Andes, differing only in insignificant points from the proposal of the Expert Señor Moreno. These differences are derived from the fact that whilst Señor Moreno followed the line of heights dividing the waters which belong to the chain, Mr. Buchanan and Señores Uriburu and MacIver have determined the frontier from the Socompa Volcano to the Sierra Nevada along the highest summits, without taking into account the local division of the waters referred to. Such a line is in reality more regular, less costly to mark out, and in no wise alters, in view of the conformation of the ground, the conditions essential to a good frontier. The deviation of the line to the

east of the Cordillera, so as to leave in Chile the north-western angle of the Puna de Atacama, has its probable explanation in the very conditions which the Argentine-Chilian frontier must combine. In fact, between 23° S. lat. and the Socompa Volcano there exist wide openings which facilitate the crossing of the main chain of the Cordillera close to the town of San Pedro de Atacama, although that chain is formed by the series of the highest summits. The barren height, exceeding 4500 metres (14,764 feet) between meridian 67° W. long. of Greenwich and the principal chain of the Andes, forming also a climatic barrier, is as efficient a boundary (owing to its desolate condition) as the range itself.

Moreover, the line as traced by the Commissioners avoids the difficulty which might otherwise have been encountered if the Cordillera de los Andes had been followed from its intersection with parallel 23° S. lat. To the north of this parallel, between it and the straight line from Licancaur to Zapaleri to which the Chilian-Bolivian Treaty of truce refers, there is a tract of land subject to Chilian jurisdiction. As the boundary between this tract and the Argentine territories to the south of 23° S. lat. had not been settled, the Commissioners, being aware of this omission, solved the difficulty by tracing the limit from 67° W. long. to Mount Rincon, and from thence to the Cordillera at the point called Socompa Volcano.

The frontier which the Argentine Republic seeks is that which as far as possible prevents complications between the neighbouring populations of both countries, and the resolution of the three Commissioners *ad hoc* satisfies her aspirations in that sense. No disputes are possible between customs or military authorities, nor between neighbouring settlements, within the space comprised between 23° S. lat. and the Sierra Nevada. No large towns can be established close to the line, and the height of the "cerros" and tablelands between the above parallel and Socompa Volcano forms there as great a barrier as the crest of the Andes does on the remainder of the frontier.

The straight line from the intersection of 67° W. long. with 23° S. lat. to Mount Rincon, as well as the other straight lines of the limit, crosses streams and lagoons. Though this is in contradiction with the theory of the Chilian Expert, the dividing line is easy to trace, and does not give to one country easier access than to the other.

8. FURTHER CONSIDERATIONS ON THE SAN FRANCISCO LANDMARK.

The persistency of some Chilean geographers in defending the San Francisco landmark against their own scientific opinions as to the orography of the region, answered, as already said, the purpose of incorporating the Puna de Atacama under Chilean dominion. Thus, when during the negotiations which preceded the Agreement of 1896 it was hoped that, by acknowledging the Argentine sovereignty over the Puna, Chile might obtain territorial advantages in the south, the removal of that landmark was not objected to, and in the diverse projects of compromise all the Chilean negotiators, without a single exception, proposed it to be transferred to Mount Tres Cruces in the true Cordillera de los Andes. Señores Barros Arana, Morla Vicuña and Guerrero framed different drafts to solve the then pending difficulties, but in all of them the abandonment of the pretension over the isolated summit of San Francisco was clearly stated.

As a matter of fact, with the solution of the divergences that had arisen from the demarcation of the boundary from 23° to $26^{\circ} 52' 45''$, a solution which recognises Argentine dominion as far as the *Cordillera de los Andes*, properly so called, to the west of the Mount and the Gap San Francisco (thus condemning the alleged jurisdiction of Chile over those regions), the removal of the provisional landmark erroneously placed at the said Gap becomes *unavoidable*.

Señor San Roman, referring to this point, says * :—

P. 577.—“Let it be supposed (the solution relating to the removal of the provisional landmark), that it lies in the prolongation from Tres Cruces to Juncalito, following the imaginary axis of the Cordillera Real across the ground and along the heights which there run in the same direction. . . .

“Moreover, a solution by these means would oblige the Boundary Commissions to undertake a long and laborious investigation for defining the boundary of the ex-Bolivian, now Chilean region, from Juncalito to San Francisco, unless, as it has been reported, our Experts and engineers should abandon that region, and in that case, and thus only, could be understood the removal of the San Francisco landmark as desired by the Argentines, *and it is not conceivable that we could have any interest in objecting thereto*. If we unwillingly

* *Desierto y Cordilleras de Atacama, etc., vol. ii.*

abandon the Atacama Andes, which are indispensable to our deserts, of no service to Bolivia, and without interest for Argentina, let this solution be accepted, but we should in this hypothesis enter into discussion upon a subject which is not certain and which we do not believe. We hope that geographers in their dealings with diplomacy would not think fit to entangle us with a question that does not exist or ought not to exist."

P. 578.—"To call for arbitration thereupon is not worth the trouble, and should our neighbours (Argentina), after examining the matter, still insist upon coming to Tres Cruces and Juncalito, but no further, *it would be better to meet their wishes.*"

P. 629.—"In any case, the public opinion of both nations may rest in the assurance that the possession of the San Francisco Gap is of no importance, either by reason of the actual value of the territory which it embraces, or by reason of its strategic conditions. Its value as a point of the frontier is for either *country of no importance except in relation to the definitive nationality of the important territories, mentioned in the truce arranged between Chile and Bolivia*, and which are under Chilian possession and dominion; and while time glides away, by consolidating the present situation or by preparing its final solution, nothing may disturb the now existing stable equilibrium. WHEN SUCH SOLUTION IS ARRIVED AT, THEN IN ACCORDANCE WITH ITS CONCLUSIONS, THE SAN FRANCISCO LANDMARK WOULD OR WOULD NOT BE REMOVED TO A POINT FURTHER WEST."

Further on, arguing against the proposal of the Argentine Expert, Señor Quirno Costa, to remove the landmark from San Francisco Gap to that of Santa Rosa, Señor San Roman states that the proposal was erroneous, and can only be explained "as a means of thereby arriving at an acceptable agreement"; and he continues:—

P. 699.—"In fact, between the Santa Rosa Gap and that of San Francisco, there exist the intermediary solution of the *high summits of Tres Cruces, on the crest of the Andes where the real chain is single and unquestionable*. There has been no lack of voices in Chile (and that of the undersigned was among the first) to advocate the idea of this understanding in the case of San Francisco, although continuing to maintain and demonstrate with the irrefutable logic of the facts of nature, and the spirit of international compacts, the exact and well authorised location of the landmark in the pass or gap of the same name."

P. 703.—"The point of conciliation would be *in Tres Cruces, a superb mass completely covered with snow, the high peaks of which coincide with the true and only Cordillera de los Andes, from whence the direct prolongation of the Cordillera is visible towards the north.*"

The Argentine Expert, Señor Moreno, personally investigated the point, on the spot, and in applying the Treaties in their true spirit, took also into account that the frontier line must be traced in such a manner that it should never give rise to misunderstandings, that it should be determined by natural features, that it should be "easy to distinguish and difficult to cross," and that it should constitute a line impossible to be modified through the act of man.

Bearing thus in mind the interests which might be affected, he proposed to the Chilian Expert that the boundary line should be prolonged from the Pass of Pirca de Indios, situated to the south of the Volcano Juncal, or Wheelwright, as far as Mount Cenizo, belonging to "the block of Tres Cruces," a superb mass, of nearly 23,000 feet high, "the high peaks of which coincide with the true and only Cordillera de los Andes, from whence the direct prolongation of the Cordillera is visible towards the north," and where, according also to Señor San Roman, "the real chain is single and unquestionable."

The Chilian Expert maintained, on his part, that the landmark of San Francisco had been placed in the highest crest of the main chain of the Andes, which separates the continental waters *and divides the Chilian and Argentine slopes of the Pacific and the Atlantic.*

The Argentine Expert contended that the landmark had been erroneously placed, that it was not within the Cordillera de los Andes, but, on the contrary, far and away from the "most elevated crests of the Andes"; that this term is quite different from the "general Andean system," a vague expression which can be interpreted according to the interests of the moment; that the "general Andean system" has never been mentioned in the Treaties, any more than the continental waters or the "*separation of the two slopes of the Atlantic and the Pacific*"; and that the landmark ought to be removed to the true Cordillera de los Andes, "where the real chain is single and unquestionable." Moreover, even from the Chilian Expert's point of view, the boundary thus marked out would not be objectionable, since it is not intersected by any rivers, as the basin of the Laguna Verde to the west of the pass of San Francisco is enclosed by the "highest crest" of the Cordillera de los Andes, in the line of *slopes* of its principal chain. The word "slopes" is thus applied according to the true signification given to it in the Treaty of 1881 and the Protocol of 1893, and as it is understood by Señores Barros Arana, San Roman and Bertrand—only to mention the principal Chilian authorities. Besides, Señor Sayago, a Chilian engineer, who has surveyed an important part of the northern Cordillera, uses the term "vertientes" in the sense of *slopes*. When dealing with the eastern or western declivities which descend from the *anticlinal line*, he speaks of "Argentine vertiente" and "Chilian vertiente."*

The Chilian Expert, in explaining the words of Article 1 of the Treaty of

* La Cuestion de Límites Chileno-Argentina en la Region Atacameña, Valparaíso, 1896, pp. 31 and 32.

1881 "and shall pass between the 'vertientes' which descend one side and the other," has persistently endeavoured to prove that "vertientes" means springs which flow to the Atlantic and to the Pacific; but all his dialectic falls through before the considerations made in page 201, and before the quotations from his book, in editions prior and subsequent to the Treaty of 1881. "Vertientes," according to Señor Barros Arana, till 1888 meant slopes and not sources.

The Treaty of 1881, for Señor Barros Arana as well as for the Chilean geographers, Señores Pissis, Domeyko, Philippi, Bertrand,* San Roman, Sayago, Steffen, etc., refers to the two "vertientes," "slopes" or "versants," eastern and western, of the Cordillera de los Andes, and not to "vertientes" bearing the meaning of sources or springs.

The Surveyors to be sent by the Government of Her Britannic Majesty will verify that the basin of Laguna Verde has no outlet. The question is, besides, of little importance, as the intersection by a river does not modify the orographical character of a chain of mountains: neither the Chilean Expert nor the Chilean geographers who have explored the ground, nor the diplomatic representatives and delegates of the respective countries, have ever doubted that the Cordillera Real de Bolivia, that is to say, the chain of Granadas or Galan, Cavalonga, Pucas, etc., continues to be such a Cordillera, though it is intersected by the rivers Las Burras or Susques, and Patos. Señor Muñoz has said that the Cordillera Real is a continuous one, and Señor San Roman states that the backbone of a mountain chain characterises itself unmistakably and with all evidence, and adds †:—

P. 10.—"Must be admitted that in some cases the irregularities, or complicated features in the boundary line, may cause inconveniences, but since those inconveniences merely refer to the form of tracing the line without detriment to its clearness, its evidence, and the tangibleness of its course, they cannot offer any difficulty.

P. 11.—"Natural political boundaries are impossible where so valuable and ancient rights exist as in Europe. Such is also the case in the subdivision of federated countries,

* Besides the passages already quoted from Señor Bertrand's Estudio técnico, the following may be added:—P. 103:—"The declivities of the ground would carry the waters falling on the *eastern slopes* of the Pass through a few insignificant depressions which occur a little to the north of the road, to empty into the very *vegas* of San Francisco, the altitude of which, in accordance with the map, is 3890 metres above the level of the sea" . . . ; P. 104:—"On the other hand, the waters of the western 'vertiente' of San Francisco would flow through the channel of the present ravines to empty themselves into the somewhat considerable basin of Laguna Verde," . . . In this case "vertientes" is synonymous with "falda" (slope), and not with source or spring.

† Estudios y datos prácticos sobre las cuestiones internacionales de límites, etc.

as in the United States, where the imaginary straight line, carefully fixed across mountains, valleys, lakes and prairies, serves as a natural division, which only the Yankees are able to define as such; but it is not so in Chile, where here and there a river, from sea to Cordillera, *or a mountain from north to south*, has permitted our simple and convenient interprovincial subdivision; and that kind of boundary will certainly be practicable between the kindred and conterminous republics *which the Cordillera de los Andes separates.*"

Moreover, if according to the Treaties, the rivers can be crossed, there can be no objection to drawing the boundary line along the Cordillera crests, separating two basins which have no intercommunication. This solution appears even more logical if it is borne in mind that those crests, being situated in a region considered by all those who have visited it as one of the most desolate in the world, seem especially destined to be the frontier division, all the more so, as they are situated halfway between the available Chilian and Argentine valleys, and unite enormous blocks, the summits of which form the line dividing the eastern and western slopes of the *Cordillera de los Andes*, that is to say, its principal chain which separates the waters.

It has already been seen that the Chilian delegates at Buenos Aires, in proposing the tracing of the boundary along the Cordillera Real de Bolivia,—which they erroneously considered to be the main chain of the Cordillera de los Andes,—*cut across* with their line the rivers Burras and Patos; and that they considered the intersected chain as *combining the conditions of height, continuity of elevated summits and division of waters contemplated in the Treaties*. This being so, and since Mounts Tres Cruces and Juncalito rise in the crest of the Andes in their north and south prolongation, as stated by Chilian geographers, the first dividing landmark must necessarily be planted between those mountains and, therefore, in Pirca de Indios (No. 1 of the Argentine frontier line), which is situated in that prolongation. There is to be found the line of the main chain of the Andes, while San Francisco Gap (No. 1 of the Chilian line) is far outside the true Cordillera de los Andes. *The opening between Mount Tres Cruces and Mount Juncalito or Wheelwright does not interrupt the Cordillera, just as in the opinion of the Chilian delegates the openings of Las Burras and Los Patos do not interrupt the eastern chain.*

The accompanying diagram (Plate XXXI.), and Map I., render unnecessary any further explanation upon the correctness of the line represented by Nos. 1, 2 and 3 of the Argentine proposal and upon the incorrectness of the one represented by Nos. 1 to 10 in the Chilian proposition.

CHAPTER XVIII.

- Summary*—1. THE BOUNDARY BETWEEN PARALLELS $26^{\circ} 52' 45''$ AND 40° S. LAT.
 OPINIONS OF DOCTORS BURMEISTER AND BRACKEBUSCH.
 2. REMARKS ON THE STATEMENT OF THE CHILIAN REPRESENTATIVE AS TO THE
 HEIGHTS OF THE LINE.
 3. THE ARGENTINE LINE BETWEEN PARALLELS $26^{\circ} 52' 45''$ AND 40° S. LAT.

**1. THE BOUNDARY BETWEEN PARALLELS $26^{\circ} 52' 45''$ AND 40° S. LAT.
 OPINIONS OF DOCTORS BURMEISTER AND BRACKEBUSCH.**

ALTHOUGH no divergence has arisen, when planting between Mount Tres Cruces and 40° S. lat. (an extent of thirteen degrees) the boundary marks, it is nevertheless necessary to briefly describe that part of the Cordillera de los Andes, in order to graphically prove the error committed by the Chilian Representative when affirming that the Argentine Expert has accepted in this zone the same theory of the continental divide which he expressly rejected at the meetings of August and September 1898, and on every occasion in which he dealt with it. From the coincidence existing in this section between the interoceanic water-parting and the Cordillera de los Andes, the Chilian Representative's misconception is derived. Once that coincidence is pointed out his argument falls through.

Considering them as favourable to his doctrines, the Chilian Representative has quoted with encomium two authorities—Doctor Hermann Burmeister* and

* The Representative of Chile, speaking of scientific men who have devoted themselves to the study of the geography of the Argentine Republic, has said: "The most eminent is without doubt Dr. Hermann Burmeister, who for many years was Director of the Museum of Buenos Aires, and had every official capacity for studying the history and geography of the country." . . . "In order to quote only," he adds, "those works which are of scientific value, it will be sufficient to mention here the learned Professor Hermann Burmeister, who occupied in Buenos Aires the post of Director of the Natural History Museum. Availing himself of all the maps of some value known until then, of his own observations in several travels to the territories of the interior, and to the Cordilleras, Dr. Burmeister had made a map of that Republic down to 40° S. lat., which was considered the best cartographic document of that country. In it, the frontier-line between Chile and the Argentine Republic is throughout traced on the water-parting line."

The Chilian Representative falls into an error which destroys any value his quotation might have had.



DIAGRAMMATIC SKETCH SHOWING THE DIFFERENT CHAINS BETWEEN THE CORDILLERA REAL DE BOLIVIA AND THE CORDILLERA DE LOS ANDES TO THE NORTH OF 34° S. LAT.

Doctor Louis Brackebusch—whose opinions must be examined, since they are held in such a high esteem.

Dr. Burmeister, whose views on the boundary chain in the northern part have been already cited (page 608), has annexed to the Report of his journey across the Cordillera, in 1860—from Catamarca to Copiapó—a map of the route, in which the range is distinctly shown as divided into two branches, the eastern Cordillera and the western Cordillera or boundary chain (“la linea”), and in which the Sierra de Famatina is considered as an independent one. The reproduction of the map referred to makes further explanations unnecessary.

Dr. Burmeister, besides, in his *Description physique de la République Argentine** when dealing with the mountains of the Argentine territory, is very explicit. He divides them into four groups:—

P. 155.—“1. *The Cordilleras*, the country’s western frontiers, the highest summits of which are crowned with volcanoes, extinct for the great part, and emerging from the midst of eternal snows.

“2. The secondary chains of Aconquija, Famatina and of S. Juan and Mendoza, united under the name of Sierra de Uspallata. They may be considered as branches of the *Cordilleras*, though they are not in close communication with them. There are to be found summits covered with snow.

“3. The entirely isolated central system of the Sierra de Córdoba, with its parallel chains of low elevation.

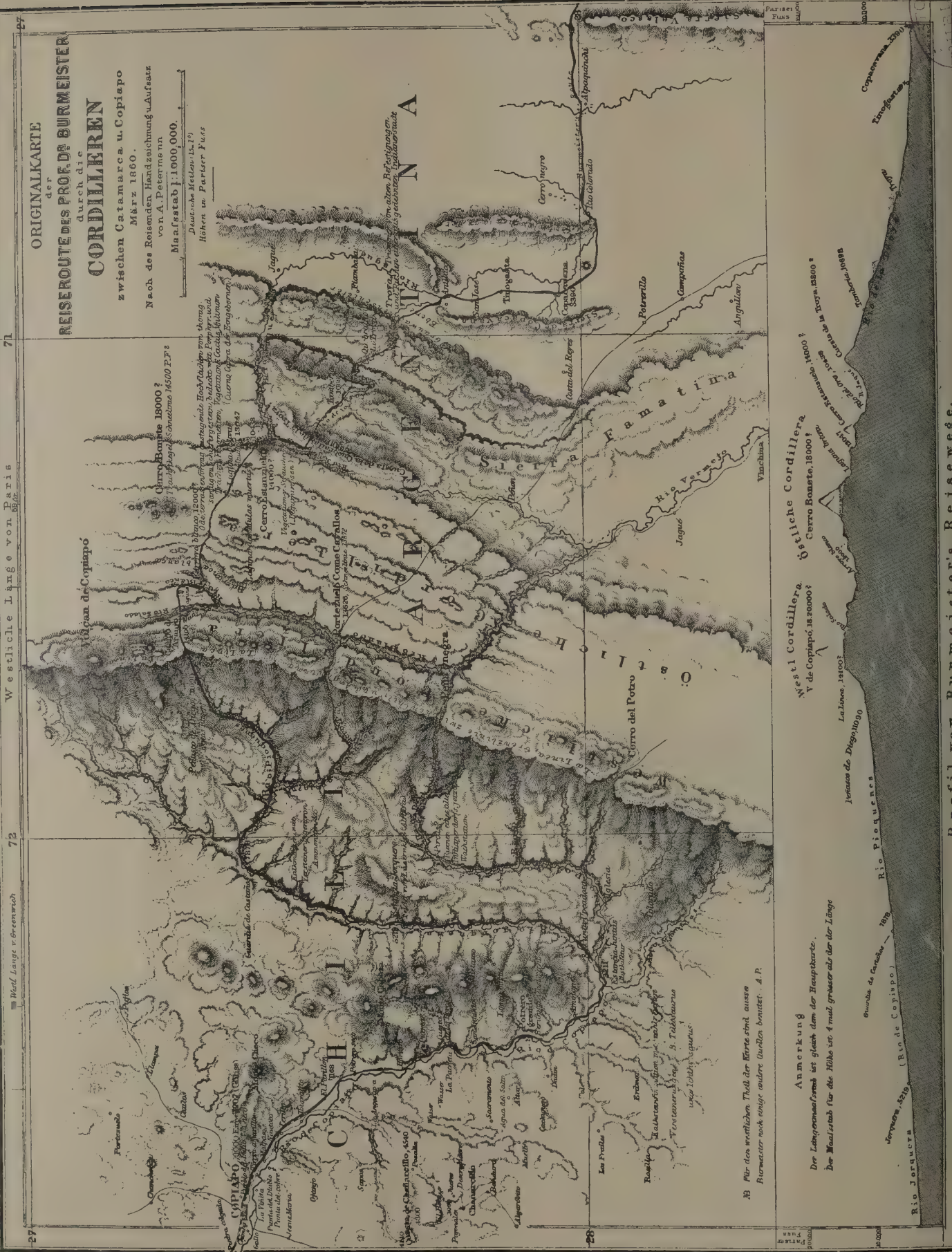
“4. The Sierras of the Pampas, of very low elevation, to the south of Buenos Aires.”

Continuing his description, Dr. Burmeister considers the northern portion of the Cordillera de los Andes as developing in a high plateau in which lie several detached mountains, and adds:—

Dr. Burmeister has not made any map of the Argentine Republic down to 40° S. lat.; on the contrary, he has made public his disapproval of the map of Dr. Petermann, which, undoubtedly, is the one referred to by the Representative of Chile. In his Description Physique de la République Argentine, Paris, 1876, vol. 1, p. 389, Dr. Burmeister says:—

“As to the map of the Argentine Republic, published by the same celebrated geographer in No. 39 of the Complementary Sheets, and for which, at his special invitation, I wrote a brief text, it is evidently a fine work, *only open to the reproach of having sometimes placed too much confidence in sources which were quite inadequate.* I had warned Dr. Petermann as to some materials and had expressed the desire that he would send me the map before publishing it, in order that I might revise it, and take it as the basis of my text. *But he did not comply with my request.* I found myself compelled, owing to repeated entreaties, to write the text without having seen the map, with the result, that in several places the two works differ from one another. A note added to my text by Dr. Habenicht points out these differences. . . . Finally, the names of localities, taken in great part from the Atlas of Martin de Moussy, *as well as the configuration of the ground are wanting in correctness, and ARE FOUNDED MORE UPON FANCY than upon the author’s own observations, as is the case with all his maps.*”

* Paris, 1876, vol. 1.



PROFIL VON BURMEISTER'S REISEWEGE.

DR. HERMANN BURMEISTER, 1860. (Published by permission.)

GOTHA JUSTUS PERTHES.

1860

P. 197.—“The plateau itself becomes a little higher on the west, through two slight steps, and terminates by a precipitous slope which forms at the same time the limit of the plateau of the Cordillera and that between Chile and the Argentine Republic.”

P. 200.—“At the point where the transformation of the western plateau in a ridge of a mountain begins, is situated the fourth great snow peak of the whole plateau, the Cerro del Potro. By its position on the western border of the plateau, and by its shape and height of 5565 metres (18,258 feet), it corresponds with the Volcano of Copiapó, *as the Cerro de San Francisco corresponds with the Cerro Bonete on the eastern plateau.* From this point all the snow summits to the south belong only to the western ridge as far as Tupungato which is situated between the two chains. The snowy summits do not appear again on the eastern chain till near Mendoza; and a little further south, at the Volcano of Maipú by 34° S. lat., it entirely disappears. The Cordillera has thence but a single crest. It is important to note that in the same region, or a little further north, in 33° S. lat., commences the large longitudinal valley which traverses in all its length the southern part of Chile, and passes out into the sea at Puerto Montt, dividing the continent from the island of Chiloé and the Chonos Archipelago.

“*The southern half of the Argentine Cordillera is not known to me by personal observation.** From there (Sierra de Uspallata) could be seen all the summits, ridges, and peaks in the extent of a degree of latitude (32° to 33° S. lat.).”

P. 201.—“For the present I will confine myself to remarking that the two most prominent summits of this part, the Aconcagua and the Ligua, called Mercedario on the map of Pissis, were in sight. The height of the latter is 6834 metres (22,422 feet), and that of the former 6798 metres (22,303 feet). . . . From Mendoza I could gain every day a second view of the southern Cordillera, and even a better one from the little town of Luján, situated further south. But from there the first eastern chain was only to be seen, with the culminating point Tupungato, 6710 metres (22,015 feet) which rises between the two chains. . . .

“All that has just been said shows that the Cordilleras system, *with a breadth of a degree and a half of longitude, and forming a compact mass in the part situated to the north of 29° 30' S. lat., is divided south of that point into isolated chains.* Some valleys are intercalated between the broad mountain ridges, and extending their slopes till the bottoms of deep ravines divide those ridges into secondary links. In 30° S. lat., and besides Sierra Famatina which is already detached at 29° S. lat., there exist four more or less parallel chains the breadth and height of which cross from east to west. *The fourth and last, the most western, constitutes the REAL CHAIN OF THE CORDILLERAS and forms the boundary between Chile and the Argentine Republic.* This elevated chain is the only one which still has snow-capped summits. The other three as far as Mendoza are of low elevation, without important summits, and in the greater part, without ridges and saw-teeth, covered with gravel and sand, and have only a scarce and poor vegetation.”

P. 202.—“We have already described (p. 189) the first and most eastern of these three chains. It is composed of four small sierras, *Vinchina, Guandacol, Mogna and Villicum* which we have indicated as branches of the third terrace of the Famatina system, i.e. the

* As the Representative of Chile has quoted opinions of Dr. Burmeister relating to that part of the Cordillera, it is important to bear in mind his own declaration.

Sierra de Machaco. For the sake of clearness, I shall call *this isolated and eastern chain, Anterior Cordillera (Pro-cordillera)*.

"The second chain has also been mentioned as the prolongation of the Eastern plateau. It is a little broader, does not contain any longitudinal valley, and it has a great importance owing to its metalliferous veins, the richest of which are those of copper and silver. By its petrological character it is connected with the eastern plateau, and it is composed, in a great extent, of paleozoic sediment of primitive periods, with intrusions of porphyry. It begins in Sierra de Jachal, it continues in Sierra de Gualilan, followed, to the south of the river San Juan, by Sierra de Tontal, and terminates near Mendoza in Sierra de Uspallata, in which, as in those formerly mentioned, trachyte and volcanic ashes are to be found. *I shall call this second chain Lat-ral Cordillera (Contra-Cordillera)*, because it runs by the side of the principal Cordillera, and directly emerges as a prolongation of the eastern plateau. *The third and fourth chains constitute the principal Cordillera (CORDILLERA REAL)*. They are very close to each other, and a wide longitudinal valley along which the Rio Blanco flows, separates them completely from the lateral Cordillera."

P. 203. — "The two chains of the *principal Cordillera* are very much wider to the east, and the valley, which up to there is broad, becomes so restricted that it is transformed only into a narrow passage several leagues long, called valley of Calingasta. In this valley, the two tributaries of the river San Juan—the river Castaño, and the river de los Patos—reunite and flow between the chains of the *Cordillera*, which are here very wide. Here rises the lofty Aconcagua, the highest peak of our Cordilleras, a mass of sedimentary rocks resembling those which constitute the two chains and which has been forced upwards by porphyry. Its summit is divided into two parts not very high but rather long, as can be seen on a sketch drawn by me which will appear in the Atlas. The valley of the river Mendoza, which has its source on the western side of Aconcagua, *cuts to the south through the eastern chain of the principal Cordillera by a narrow gorge called by the natives 'El Cajón.'* It reaches the plain, at the side of the Sierra de Uspallata, and the river flows to the north-east, winding round the extremity of this Sierra. The eastern chain of the Cordillera, larger than the western, continues beyond Cajón; the western chain is not interrupted, but decreases a little to form at the height of 3803 metres (12,477 feet), the pass of the 'Cumbre,' which has always been the principal road to Chile. The two chains continue some distance to the south, leaving between them a narrow valley in which rises the volcanic cone of Tupungato, 6710 metres (22,015 feet); then they gradually approach each other till they unite in a single chain, in the neighbourhood of the Maipu Volcano, 5385 metres (17,668 feet), in 34° S. lat., and continue without interruption as far as the Straits of Magellan. *I have nothing particular to state about this southern part of the Cordilleras, as I have not seen it myself*, and therefore I could only repeat what other travellers have already said. Everyone knows that south of the point where they unite, near the Maipu Volcano, which is still active, *the Cordilleras* continue their course: that the Maipu belongs to them, and that it has formerly been violently eruptive. It is also known that the Cordillera decreases in altitude towards the south, that in its crest there are deep depressions, and that it is cut through by deep and narrow valleys or *cajones*. There exist one, and perhaps several lakes. One of these points has been recently explored. It is situated in the neighbourhood of 40° S. lat., between the

large lake at the western foot of the Cordilleras, *which receives through the pass the waters of the corresponding lake situated at the eastern foot. As from the two lakes to the east and west rivers flow into the sea, this watercourse would constitute a direct communication.*" *

"Let us return to the two chains of the principal Cordillera, to the north of their junction near Maipu, and make a few remarks on them. The two chains to the south of the river Mendoza *are not only almost of the same height, but in both are to be found summits covered with perpetual snow*, which, in the north, are lacking in the eastern range, with the exception of one or two situated at the extremity of the valley to the north of Uspallata. *I have not seen the snow summits of the western range.* From north to south four are found on the map: Juncal, 5942 metres (19,496 feet), Cerro de Plomo, a little to the west outside the crest, 5105 metres (16,750 feet), San José, 6090 metres (19,981 feet), and Maipu, 5385 metres (17,668 feet)."

P. 206.—"Several portions of the serrated crest have snow-covered summits, and not very far from Maipu, could be seen two sharp-pointed peaks, between which lies the Pass of Portillo. The height of this pass, *which crosses the two chains of the Cordilleras*, has been fixed by different observers between 4000 metres (13,124 feet) and 4200 metres (13,780 feet); in the western chain, where it takes the name of Paso-Piuquenes, it is not more than between 3700 metres (12,139 feet) and 3800 metres (12,467 feet), and it may be passed over in summer without meeting snow, as Darwin ascertained at the time of his travels. . . .† From the two sides of Mount Tupungato, that is to say, from the north and south, a continuous stream flows, which, fed by the neighbouring snow summits, constitute before long a little river. The streams from the north unite and form the source of the river Mendoza, which here takes the name of Tupungato *and at some distance sinks down the gorge which leads to the Pass of the Cumbre.* Those from the southern side form the river Tunuyán which flows for some distance between the two chains, *and afterwards cuts through the eastern chain to the south of the Pass of Portillo.* When it reaches the plain it curves to the north-east, towards the river Mendoza, which flows to the south-east, just in the same manner as the two original branches of the river San Juan before their junction. The rivers Mendoza and Tunuyán remain separated, and branch off in different directions some distance away. Reascending more to the north, above the ravines of the river Mendoza, we reach the mountainous mass on the western side of which stands Aconcagua, one of the highest points of the Cordilleras. Two narrow ravines,—that of the river Cuevas to the south, and that of the river de los Patos to the north,—separate Aconcagua from the western chain which runs a little distance to the side of it. It slopes down again with some very steep declivities at the side of these ravines, but it extends to the east through long links. These links run as far as the Valley of Uspallata, and are bounded at the edge of the rather wide plain of this valley by rounded and isolated summits of porphyry. A great link is detached from the eastern side of Aconcagua, takes a northern direction, and represents the prolongation of the eastern chain. It is separated from the western, which is wide in this part, by a narrow valley in which the river de los Patos continues its course to the north, and is known to the natives by the special name of *Cordillera del Tigre.* Two lofty

* He refers to Lake Lacar.

† Dr. Burmeister gives further particulars concerning that part of the Cordillera.

summits which rise as far as the region of perpetual snow, 4800 metres (15,748 feet) and 4900 metres (16,076 feet), issue from this isolated link and clearly denote that it is the prolongation of the eastern chain. They are, in fact, exactly in the direction of the Cerro de la Plata, and of its companions. These are the last snow summits of the eastern chain on the northern side. The river de los Patos winds round the end of this link to leave the mountains, and flows towards the north-east till it reaches the river Castaño with which it joins the San Juan. The prolongation of the eastern chain is between the two rivers, where it forms a group of mountains cut away by deep valleys of medium height but fairly broad. They are called Sierra de Castaño, and to the north a third prolongation of the same chain continues. This is longer and narrower, and is called Sierra de las Leñas. It continues to the north till near the great plateau, from which it is separated by the valley of the river Blanco. There the distinctive character of the chains becomes lost in the plateau. The three isolated chains which in this region constitute the principal eastern chain of the Cordilleras, namely, the Sierra de las Leñas, Sierra de Castaño, and the Cordillera de Tigre, approach very near the western chain. Between them there exists but a narrow valley, without water in the north, and in which two streams flow to the south, forming the sources of the river Castaño. The metallic riches of this valley, however, give it importance, and account for the activity which reigns in the valley, *between the principal Cordillera and the little Sierras*, also rich in minerals, of the *lateral Cordillera*, of which we have already spoken on page 199, under the names of Sierra de Gualilán and Sierra Tontal."

Describing the Passes in the mountains, and after mentioning those of San Francisco, of the Quebrada de la Troya, Come Caballos, and Peña Negra, Doctor Burmeister says :—

P. 209.—"The fifth pass leads to the edge of the Cordilleras, in the valley of the river Manflas, by the *Portezuelo del Cerro de Potro*, in $28^{\circ} 30'$ S. lat. The route comes from San Juan and follows the foregoing as far as the border of the western plateau of the Cordilleras. . . . A sixth pass lies in the *Portezuelo de Doña Ana*, in $29^{\circ} 36'$ S. lat., with an altitude of 4447 metres (14,590 feet). It begins in the valley of the river Jachal, follows its last southern arm, and from the edge of the Cordilleras it runs down into the valley of the river Coquimbo. . . . The seventh pass is that of the river los Patos, which is situated between the valleys of the tributaries of the rivers San Juan and Limari to the north, and the valley of the river Aconcagua to the south. To the north, the valley of the river Castaño and to the south that of the river los Patos ascend to the edge of the Cordilleras. The passes of the river Castaño's valley take the names of Portillo de Vicente and Portillo del Valle Hermoso; the first is found to be 4120 metres (13,517 feet), and the second 4280 metres (14,042 feet) in altitude. The principal passage is that of the south, through the valley of the river los Patos, and is especially called *Camino de los Patos*. The route leaves the river some distance below its source, and crosses through a lateral ravine, a secondary link of the Cordilleras, the height of which is 4238 metres (13,904 feet). *It descends again to the valley of the river los Patos, and follows a lateral gorge, reaching the Portillo del Valle HERMOSO AT THE CREST OF THE CORDILLERA*, the height of which, according to the map of Pissis, is not more than 3365 metres (11,040 feet). After this it descends into the valley of

the river Putaendo, which falls into the river Aconcagua, at San Felipe. It is over this pass that the army of General San Martin crossed to Chile."

P. 213.—"After the Cordilleras, the Sierra Famatina is the most important mountain of the country. It extends through four degrees of latitude (from 28° to 32° S. lat.) and its culminating summits attain the region of perpetual snow."

P. 304.—"The river Tunuyán is less complicated than the preceding two. It receives its waters from the extremity of the valley situated *between the two principal chains of the Cordilleras, south of Tupungato*, the snow-covered summits of which feed its main sources, and from the eastern slopes of the eastern Cordilleras, which in this part have several high snow summits."

The accompanying reproduction of the geological map published by Dr. Burmeister in his book, shows the different denominations that he adopts when dealing with the mountains of the north-western region of Argentina: the "Pro-Cordillera," the "Contra-Cordillera," the "Plateau des Cordillères" and the "Cordillera Real," the last being considered by the writer as the true Cordillera de los Andes, and as the *Chilian boundary* (*frontière du Chili*): It also defines perfectly well the lateral extension of this last Cordillera, separated from the Contra-Cordillera by the eastern longitudinal valley.

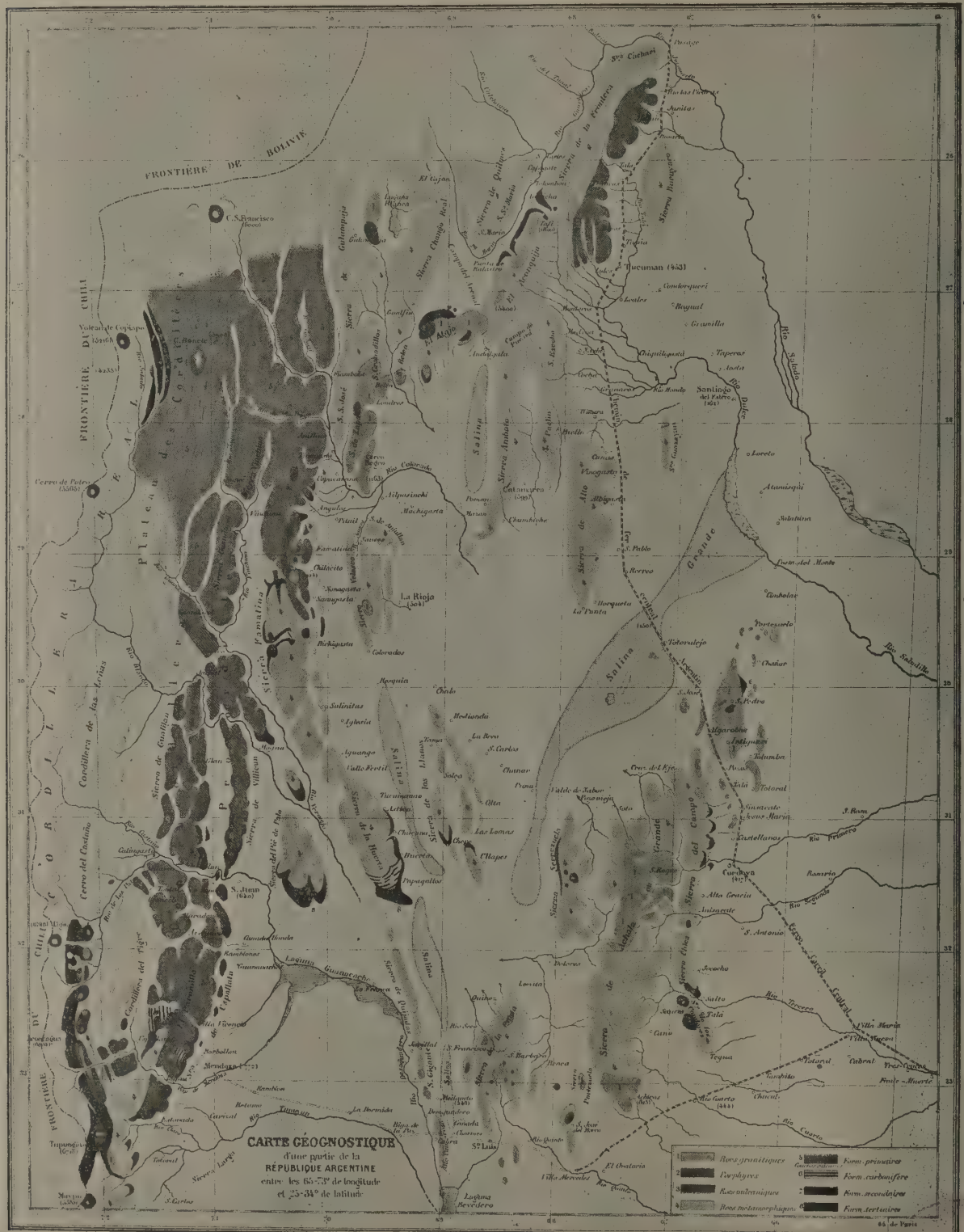
It has already been said that Dr. Brackebusch considers that the Gap and the isolated Volcano of San Francisco are not within the Cordillera de los Andes, which forms the Argentine-Chilian boundary (p. 586). The opinions of Dr. Brackebusch, therefore, entirely differ from those which the Chilian Expert has maintained when he pretended to plant a definitive landmark in that Pass or Gap. In fact, Dr. Brackebusch says * :—

"Further to the west of the Nevado de San Francisco, there is a Cordillera, running from the north (called by San Roman 'Cordillera de Claudio Gay'), which presents in its commencement some volcanic rocks and continues along Tres Cruces† and Patos, the peak of Bonete, Estanzuelo Peñon (from here is to be found granite with fragments of argillaceous schists), Pastos Amarillos until it reaches Alto del Cachipaya. This chain joins on to the west with a tableland, which may be seen from 'Laguna Brava' (belonging to the Cordillera), in an extent of 500 kilometres to the south."

According to Dr. Brackebusch, Lagunita Verde, Santa Rosa, San Guillermo, Chinguillas, Tudum, Tocota, Calingasta, Yalguaraz and Uspallata belong to that tableland. He adds that *on the west of this tableland*, called the "land of the Incas," there rises the principal western branch of "*the Cordillera properly so-called*," which splits up into Cordillera of the east and Cordillera of the west.

* Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1892, vol. 27, p. 263.

† Gap Tres Cruces is situated far to the west of Gap San Francisco.



DR. HERMANN BURMEISTER, 1876.

(From Description Physique de la République Argentine, Paris.)

The Cordillera of the east runs, according to him, from the Cordon of Tres Cruces through—

“The peak of Veladero (called by San Roman ‘Vidal Gormaz’) and the summit of Barrancas Blancas, and Fandango, as far as the heights of Brea, Carachas, San Guillermite, Fierro, Salado, Colanguil, Conconta, Olivares, Ollita, Manrique, Totorá, Ansilla, Aldeco, Espinacito, Tigre, Aconcagua, Picheuta, Jaula, Plata, Eastern Portillo, Cruz de Piedra, and La Iglesia.”

P. 265.—“Aconcagua, the king of the mountains of America (near 7000 metres height), is situated in a tableland which unites the two Cordilleras, and does not form part of either.”

P. 265.—“The character of the depression existing between the two principal southern Cordilleras, which approach each other much more than those of the north, is quite different. Here the two chains are only separated by longitudinal valleys, more or less narrow, in which are the sources of the principal rivers of the district, *which run northwards or southwards and breaking afterwards, in a curve, the formidable chain of the east, form a number of ravines, full of cataracts, of which the greater part are inaccessible.* These valleys communicate through transversal cordons, all of which appear to be accessible (my surveys are not yet complete in this point), and permit easy longitudinal transit between the two Cordilleras.”

The eastern chain, according to Dr. Brackebusch, *is intersected by the rivers Macho Muerto, del Cura, Atutia, Colorado, los Patos, Mendoza and Tunuyan*, whilst the western Cordillera runs from Mounts Potro, through the Cordillera del Inca, Taguas, Chivato, Bañitos, Deidad, Agua Negra, Tórtolas, to the Cordillera of Agua Negra, and then to the Cordillera of Doña Rosa, from whence it commences to decrease in altitude, until, again increasing, it runs through Tupungato, Maipo and Planchon, and then loses itself opposite the insular part of the south of Chile.

These descriptions, by Drs. Burmeister and Brackebusch, agree in representing the *Cordillera de los Andes* as formed by two almost parallel chains, having between them longitudinal valleys, the outlets of which are sometimes towards the east, and sometimes towards the west.

The eastern chain is bounded on the east by the longitudinal depressions of the rivers Blanco, Calingasta, Uspallata, etc., whilst the western chain is bounded on the west by the longitudinal valley of Chile, which, according also to the Chilean geographers Señores Pissis, Domeyko, Barros Arana, Philippi, San Roman, Bertrand, etc., extends through all the length of Chile from the Desert of Atacama to the channels of the Pacific, separating the Andean range from the Cordillera de la Costa, just as, to the east, the longitudinal depressions aforementioned separate the eastern chain from the ridges which form, according to Dr. Burmeister, the “Contra-Cordillera” and the “Pro-Cordillera.”

2. REMARKS ON THE STATEMENT OF THE CHILIAN REPRESENTATIVE AS TO THE HEIGHTS OF THE LINE.

The Chilean Representative has stated that, in fixing the section of the line from Tres Cruces to the vicinity of 40° S. lat.,—where fresh differences have arisen between the Experts,—“in no part has a river been crossed, nor a stream nor even a spring,” and that the line runs entirely “along the highest summits which divide the waters, varying in altitude and azimuth, according to the division of the waters, and invariably respecting this geographical condition of the demarcation.” He adds that, “in conformity with this principle, neither the thickest nor the more inaccessible masses of the mountain have been searched for in order to trace it (the line), nor the highest peaks, *if they were not situated on the water-parting line*. In all the part marked off, the greatest heights of the mountain *are very rarely situated on the boundary line*.”

In order to substantiate his assertions, he has presented to the Tribunal a list of “Points of Demarcation,” with their heights above the sea-level, and has compared them with the “Neighbouring Peaks.” It is then most necessary that the true conditions in this section of the Argentine line should be analysed, in order to point out the grave errors contained in said list.

The misleading character of this statement is apparent, as the boundary line in the Cordillera necessarily follows the continental water-parting in that part where such water-parting coincides with the high crests. The Argentine Expert has but strictly adhered to the letter and spirit of the Treaties, when tracing his line both in that section which has been rejected by his colleague and also in that which has been accepted by him.

The list referred to has been drawn up with the intention of proving that the Argentine Expert's line does not follow the highest summits, but a perfunctory examination will show that many of the “neighbouring peaks” mentioned in it are *altogether outside the main chain of the Cordillera de los Andes*.

1. The height of Puntagudo Hill,* 5960 metres (19,554 feet), is compared with that of “Ojo del Salado Ridge,” 6690 metres (21,949 feet), 32 kilometres

* The Chilean Representative gives the name of *Hills* to the highest mountains like Aconcagua, the altitude of which he asserted to be 7000 metres (22,966 feet), as well as to comparatively insignificant elevations of the ground.

(19·9 statute miles) to the east. Ojo del Salado is not situated in the Cordillera de los Andes, according to Señores Burmeister and Brackebusch, and, therefore, it does not belong to the zone within which the boundary is to be marked out. Ojo del Salado is a volcanic mountain in a lateral chain to the east of the Cordillera de los Andes.

2. Cazadero Hill or Cerro Nacimiento—which is compared with Los Patos Hill—is not situated in the Cordillera de los Andes, being indeed 35 kilometres (25·7 statute miles) to the east. This volcano is an offshoot of the eastern ridge of the intermediate chain of La Puna, to which chain, as has been already said, and as is confirmed by the opinion of Dr. Brackebusch, belongs the “Nevado de Famatina,” situated in the centre of the Argentine territory.

3. Vidal Gormaz Hill, 4740 metres (15,551 feet), is compared with Mount Pissis, 6745 metres (22,129 feet), but the latter is not situated in the Cordillera de los Andes. Mount Pissis is the same as Nacimiento del Jagüel of the Argentine maps, and is situated *between the lateral eastern chains of the Cordillera, and the western ridge of the intermediate chain already mentioned*. Vidal Gormaz Hill of the Chilean line is an enigma. There is not a conspicuous mountain in that part of the Cordillera, as is proved by the relative small height attributed to it, but the Argentine Expert has accepted this name, as it has been given in honour of one of the ablest geographers of Chile.

4. Pircas Negras Gap, 4100 metres (13,451 feet), is compared with Bonete Hill, 6380 metres (20,932 feet), 53 kilometres (32·9 statute miles) to the east of it. Mount Bonete is not in the Cordillera de los Andes, as has been stated by Señores Burmeister, Brackebusch, San Roman, etc., and as has been proved by the personal observations of the Argentine surveyors and the Argentine Expert himself.

5. Come Caballos Hill, 5227 metres (17,149 feet), is compared with Caserones Hills, 5170 metres (16,962 feet), and Pulido, 5490 metres (18,012 feet) to the west. Peña Negra Pass, 4380 metres (14,370 feet) is compared with Baboso Hill and Fandango Hill, 5590 metres (18,340 feet). Señor San Roman, who has personally studied this part of the Cordillera, says* that “Peñazco de Diego is at the foot of the anticlinal *Cordillera*, that is to say, the Cordillera de los Andes properly so called, the only one which, by its culminating line, determines the watershed and separates Chile from the Argentine Republic.” He adds :—

* *Desierto y Cordilleras de Atacama, etc., vol. 1, p. 56.*

P. 59.—“To the south and north of Pircas Negras, in Peña Negra, Come Caballo, Quebrada Seca, etc., it was convenient to examine and to measure the ground. In a northerly direction there is detached as an ‘anti-Cordillera,’ the majestic Cerro of the Nevado de Jotabeche.”

If Peñazco de Diego is at the foot of the Cordillera de los Andes, properly so called, and if the Pass of Pircas Negras is in the anticlinal line of the Andes, neither Caserones Hills nor Pulido Hill are situated within the range, being found to the west, although not very far away. Even though these *hills* were considered as being in a ramification of the Cordillera de los Andes, the gaps of Peñazco de Diego, Pircas Negras, Come Caballos, are certainly on the main chain of it. In order to plant the landmarks in the boundary line, the gaps—the height of which is of course less than that of the peaks in the immediate neighbourhood,—have been chosen owing to the fact that they are ‘accessible points,’ and as such their selection is in accord with the conventions for the delimitation. This notwithstanding, it is to be observed that for the purposes that the Chilian list is intended to serve, the mere indication of heights in the passes is not sufficient, since they cannot characterize the range as a whole. Fandango Hill, besides, is not in the Cordillera, and Bayo Hill, whose height is not given in the Chilian list, is of lower elevation than any of the summits of the ridge.

6. Macho Muerto Pass, that is to say, a gap of 4800 metres (14,335 feet), is compared with the Cordillera de la Brea 5405 metres (17,733 feet). The comparison between the heights of the gaps, and the highest summits of the mountains, is not a correct one. If summits were compared with summits it would be seen that whilst in the dividing ridge there are in this section, some of 5900 metres (19,358 feet), and 6277 metres (20,595 feet) the ridge of La Brea has only one of 5405 metres (17,733 feet).

7. The Cordillera de Doña Ana which has also been compared with a mere gap (Deidad Pass), is a branch of the main chain of the Andes, and the height of 5650 metres (18,537 feet) is that of its culminating point.

8. Vacas Heladas Pass, 4724 metres (15,498 feet), is compared with Conconta and Colanguil Hills, 5240 metres (17,191 feet), and 5150 metres (16,897 feet). These summits *belong to the eastern chain*, and are the highest in that zone, whilst the western chain attains 5500 metres (18,044 feet), 5350 metres (17,552 feet), and 5200 metres (17,060 feet), close to the said Pass, and in the Cerro de las Tórtolas, 6133 metres (20,121 feet). None of these altitudes has been mentioned in the Chilian list.

9. Barahona Pass, to which the altitude of 4528 metres (14,855 feet) is assigned, has been compared with Volcan Hill to the west, 5590 metres (18,340 feet), and with the Cordillera de la Cortadera, 5430 metres (17,815 feet), *which belongs to the eastern chain*. The western chain as a whole is higher than the eastern, and has in those latitudes peaks, such as Las Peladas de Olivares, at the junction of the two chains, the heights of which are 5930 metres (19,455 feet), 6240 metres (20,472 feet), and 5980 metres (19,619 feet). Mount Volcan, besides, belongs to the main chain of the Andes.

10. Puenteccillos Pass, which is compared with the Cordillera de Ansilta, is probably the Pass de los Leones of the Argentine line. The Cordillera de Ansilta, which is mentioned as measuring 5800 metres (19,030 feet), *belongs to the eastern chain*.

11. The Chilian Representative again compares gaps with summits. Mercedario Pass, 4100 metres (13,451 feet), to which he refers, is situated to the west of the peak of that name, 6700 metres (21,982 feet), *which peak belongs to a secondary branch that joins the eastern to the western chain*. In that eastern chain are found other features also mentioned in the list, as Cordillera de la Ramada, 6400 metres (20,997 feet), and Cordillera del Espinacito, 4513 metres (14,803 feet), a chain which is cut by the Los Patos river, formed by the waters of the western slope of the eastern ridge of the Cordillera, and by those of the ridge between the Mercedario and the Aconcagua, the two giants of those regions, *situated midway between the two ridges*, a circumstance which has not been taken into consideration in the framing of the list.

12. Pircas Pass is compared with the summits of Altar, 5222 metres (17,132 feet), and Plomo, 5420 metres (17,782 feet), at 19 and 15 kilometres to the west. Cerro Plomo, which measures 5560 metres (18,241 feet), is mentioned in the Argentine line, and rises in the main chain, as also Mount Polleras, 6235 metres (20,456 feet). These heights have been omitted in the list.

13. Piuquenes gap, 4054 metres (13,300 feet), is compared with the Cordillera de la Llaretta, 4450 metres (14,600 feet), *which belongs to the parallel eastern ridge*.

14. Amarillo Hill, 4606 metres (15,111 feet), is compared with Castillo Hill, 5523 metres (18,127 feet), but it is not mentioned that the last Mount is to be found in the principal chain line. It is sufficient to take into account the short distance, 3 kilometres (1.86 statute miles), between both heights to set aside this indication in the list.

15. Alvarado Pass, 3883 metres (12,739 feet), is then compared with

Laguna range, 5148 metres (16,890 feet), and 5176 metres (16,981 feet), at 21 kilometres (13·05 statute miles) east. Volcano Maipu, 5331 metres (17,490 feet), situated in the main chain, is omitted, as if to prove once more that only the lowest depressions of the Cordillera are considered.

16. Maipu Pass, 3471 metres (11,388 feet) is compared with Paramillos *Hill*, 3694 metres (11,919 feet), at 20 kilometres (18·64 statute miles) to the east, and with Atravieso de los Avestruces *Hill*, 3716 metres (12,192 feet); but the mention of the *gaps* of Mount Bayo, 3985 metres (13,074 feet), 3995 metres (13,107 feet), and 4100 metres (13,451 feet), and Mount Bayo itself, 4990 metres (16,371 feet), is avoided because it would have destroyed the argument.

17. Risco Plateado *Hill* mentioned in the Chilian list, 5000 metres (16,404 feet) is situated in the eastern ridge. It is not possible, therefore, to compare it with Las Damas *Pass*.

18. The *Passes* of Planchon, 2859 metres (9380 feet), Potrerillos, 2600 metres (8530 feet), Fierro, 2844 metres (9330 feet), Yeso, 2778 metres (9114 feet), Ángeles, 3240 metres (10,630 feet), Cajón-Chico, 2772 metres (9094 feet), Portillo, 2613 metres (8572 feet), Benitez, 2546 metres (8353 feet), Moscos, 1797 metres (5895 feet), Diucas, 1936 metres (6351 feet), Cajón Negro, 2190 metres (7185 feet), and Alico, 2035 metres (6676 feet), situated between 35° 12' and 36° 47' S. lat. are compared with *summits* which range between 3040 metres (9973 feet) as Potrerillo Hill at 1 *kilometre* (0·62 statute miles) from Potrerillo Pass, 2600 metres (8530 feet), and 4668 metres (15,315 feet) of the *Cordillera* del Domuyo, that is to say, the "Volcan Domuyo," which rises in one of the spurs of the eastern Cordillera at 50 kilometres (31·07 statute miles) to the west of the crest of the main chain.* Some of these summits are situated, according to the Chilian Representative, from 50 kilometres (31·07 statute miles) to 175 kilometres (108·7 statute miles) east and west of the main chain of the Cordillera. The Nevado Hill at 175 *kilometres* (108·7 *statute miles*) is not situated in the Cordillera de los Andes, but in an independent and isolated chain. It is sufficient to take note of the distance between this mountain and the main chain to see the groundlessness of the argument. Moreover, whilst he has selected for comparison the lowest points in the gaps of the boundary range and the highest peaks outside it, he has forgotten to state that the main chain of the Cordillera in that zone has heights such as those of the Volcanoes Planchon,

* The height calculated by the Argentine surveyors is 4252 metres (13,950 feet).

3980 metres (13,058 feet), Peteroa, 4053 metres (13,297 feet), and Campanario, 4005 metres (13,140 feet), and that the mass of the boundary crest is much superior to that of the ridges on which are situated the peaks which he mentions.

19. The *Passes* of Colocó—to which is erroneously attributed the height of Mount Colocó, 2038 metres (6686 feet), while the pass is only 1095 metres (3593 feet),—Malalco, 1481 metres (4860 feet), Añihuerahui, 1131 metres (3711 feet), Truomen, 1182 metres (3879 feet), Quilleihue, 1226 metres (4023 feet), Paimun, 1465 metres (4807 feet), Carirriño, 1085 metres (3560 feet), are compared with altitudes such as those of Uriburu Hill, 2102 metres (6910 feet),—of which it is said that it rises at 94 kilometres (58·4 statute miles) to the east while it is close to the main chain,—Volcan Viejo, 1974 metres (6477 feet), 94 kilometres (58·4 statute miles) to the east, Castillo Hill, 2266 metres (7435 feet), at 7 kilometres (4·35 statute miles) distant, Malalco Hill, 2285 metres (7497 feet), Volcan Quetrupillan, 2400 metres (7874 feet), summit of Añihuerahui, 1776 metres (5827 feet), Volcan Villarica, 2888 metres (9476 feet) at 42 kilometres (26·1 statute miles) distant, Quinquilil Hill, 2231 metres (7319 feet), Rocks 1889 metres (6198 feet), Picachos Hill, 1978 metres (6490 feet), Mamuil Malal Hill, 2129 metres (6985 feet), Capa or Llanco Hill, 1788 metres (5867 feet), at 26 kilometres east (16·16 statute miles), Puelhuellanca Peak, 1658 metres (5440 feet), 26 kilometres (16·16 statute miles) distant, Llamue Hill, 1578 metres (5178 feet), 31 kilometres (19·26 statute miles) distant, Triuque Hill, 1536 metres (5040 feet), 40 kilometres (24·86 statute miles) distant, Huencuir Hill, 2174 metres (7133 feet). However, though in the line only the gaps are always mentioned, and the highest summits out of it, it will nevertheless be seen further on that the line in this extension has altitudes of 3774 metres (12,383 feet).

The Volcano Villarica 2888 metres (9476 feet) is not situated in the main chain of the Cordillera, which is also the case with nearly all of the summits which are indicated. The existence of these high mountains on both sides of the line proves that this has been traced over the crest of the central range of the Andes, which was the real frontier in the opinion of the Chilean Expert, when he wrote his communication to the Argentine Expert, Señor Pico, dated January 18, 1892.

The line as described by the Chilean Representative, between Tres Cruces (the altitude of which, 6780 metres (22,244 feet), is not mentioned), and Mount Perihueico, 1740 metres (5710 feet), is far from presenting the real crest of the general boundary ridge, and it is necessary to call the attention of the

Tribunal to the inaccuracy of such a description, which is entirely at variance with the actual line agreed upon.

The continental divide *has not* been, therefore, the paramount principle of the Argentine Expert's proceedings. The fact of having to deal with the main chain of the Andes, on one side, and with detached peaks or independent branches, more or less extraneous to the Cordillera de los Andes, on the other, is what has decided his preference for the former over the latter, in compliance with the Treaties.

Moreover, the Chilian Representative has brought together in his list, points of comparison scattered to the east and to the west, at $1\frac{1}{2}$ kilometres from the line, at 30 kilometres, at 40 kilometres, at 53 kilometres, at 94 kilometres and even up to 175 kilometres, which show that they have been taken indiscriminately, here and there, without any scientific criterion.

The comparison is not correct, since, as it has been remarked, when the points of demarcation are determined in the list, the lowest are those selected, whilst when the neighbouring peaks have been pointed to, the highest have been mentioned. In this way, the boundary line appears to be depressed and the lateral features appear to be gigantic. Of the 46 "points of demarcation" included in the Chilian list, using the same denomination applied therein to them, only 6 refer to peaks, distributed thus, 5 *hills* and 1 *summit*; the other 40 refer to *gaps* or to *passes*, which are of course the lowest points in the sinuosities of the ridge; 35 *are passes*, 4 *are gaps* and 1 *is a ravine*. Among the neighbouring points, which have been selected to be compared with these, there is only *one pass, one gap and not a single ravine*; there are, on the other hand, 40 *hills*, 3 *volcanoes*, 2 *nevados*, 2 *summits*, 2 *peaks*, 1 *mount*, 1 *rock*, and the other 15, up to 67, *are Cordilleras, ridges and ranges*. If in order to compare orographical features, the most depressed gaps are selected in one case, and the most salient peaks on the other, it would be easy to arrive at unexpected consequences.

3. THE ARGENTINE LINE BETWEEN PARALLELS 26° 52' 45" AND 40° S. LAT.

Once the errors contained in the Chilian list have been pointed out, the line of demarcation, as really proposed by the Argentine Expert, will be described, and it will be seen that it follows the high crests that divide the waters of both slopes of the main chain of the Cordillera de los Andes.

The Treaty of 1881 and the Protocol of 1893 have determined that the operations for the demarcation of the boundary line shall be carried out in the Cordillera de los Andes, "along the most elevated crests that may divide the waters, and shall pass between the slopes which descend one side and the other," that is to say, through the line of the summit of the Cordillera, in its watershed.

The Argentine line has been projected in harmony with these stipulations, and in some sections, the points selected by the Argentine Expert, for the general tracing of the frontier (drawn up in conformity with the undertaking entered into on May 1, 1898) coincide with those proposed by the Chilian Expert. The coincidence occurs because Señor Barros Arana in these sections, has complied with the conditions established in the above-mentioned Agreements, and not because the Argentine Expert should have accepted the possibility of the line being traced outside the Cordillera de los Andes.

In marking out the Argentine line, the same procedure has been followed out as in analogous cases in countries separated by chains of mountains. The highest crests selected are those that divide the waters in the Cordillera de los Andes, and form the main chain, which, according to the Chilian Expert, is the chain, the slopes or *vertientes* of which shed the greatest quantity of water which feeds great rivers.* As to the Argentine Expert, when he proposed the general boundary line, he gave his definition according to the wording and evident meaning of the Treaties, thus fulfilling his mission (Record of September 1, 1898).

The principal heights of the Cordillera de los Andes, between 23° and 26° 52' 45" S. lat., have been mentioned in Chapter XVII. (pp. 589 and 590). They show that the regular line of high crests, which may divide the waters of the Cordillera in the region alluded to, is at a considerable altitude. The line conforms with the Treaties, and along it, have been determined not only the peaks, but also the principal "passes or gaps in the mountain," as well as its "accessible points."

* *Geografía física*, 1st edition, p. 41.

At the foot of Mount Juncal or Wheelwright ($26^{\circ} 52' 45''$ S. lat.), is situated the gap called Pirca de Indios, which is marked with No. 1 in the Argentine list of the principal points of the frontier. The divergences which have arisen between the Experts in marking the boundary line in that region, have been dealt with, and it is unnecessary again to call the attention of the Tribunal to them. It will suffice to say that between Pirca de Indios Gap, 4590 metres (15,059 feet), and the block of Tres Cruces, there exists a continuous ridge, which bounds the basin of Laguna Verde, situated to the east of it.

This ridge, which has the following altitudes, 4810 metres (15,781 feet), 4530 metres (4862 feet), 5703 metres (18,710 feet), and then to the west of Sierra Grande it falls to 5000 metres (16,404 feet), terminates at the foot of the block of Tres Cruces, the five snow-capped peaks of which are respectively 6246 metres (20,492 feet), 6356 metres (20,853 feet), 6780 metres (22,245 feet), 6640 metres (21,785 feet), and 6127 metres (20,102 feet) high. The one most to the north-east 6640 metres (21,785 feet) is called by some guides, Cenizo, while some others give this name to the one to the east, 6246 metres (20,492 feet). Mount Tres Cruces is the highest, 6780 metres (22,245 feet). This distinction is of little importance, as it does not alter the regular continuity of the boundary line.

This highest crest ("Arista" of Señor San Roman) of the Andes, commands the depressions of Laguna Verde, Cuesta de Tres Cruces, and of Rio Lamas, Ciénega Redonda, and, more to the west, the great salt deposits or *Salar* of Maricunga, which are separated from the two first depressions by the prolongation of the ridge of the "Colorados," i.e., the "Cordillera Gay" of San Roman.

To the east of the block of Tres Cruces, at its foot, lies, between this block and the ridge of Ojo del Salado, the longitudinal depression which, as previously stated, is separated from that of Lagunas Verdes to the east of Tres Quebradas, which runs in the same direction.

Plate XXXII. represents the opening of the main chain between Mount Juncal or Wheelwright and Mount Cenizo, and shows the ridge where the gaps Pirca de Indios (No. 1 of the Argentine line) and Mulas Muertas, near Mount Cenizo (No. 2), are situated. Next to Mount Cenizo is Mount Tres Cruces (No. 3), 6780 metres (22,245 feet), and further to the south, the line agreed upon runs along the main chain by Mount Cajoncillo,* 5437 metres (17,838 feet), Mount

* This enumeration contains a greater number of points than the Record of September 3, 1898, in which mention was only made of those which were necessary for the tracing of the general boundary line, leaving the intermediate ones to be fixed by the demarcating surveyors.

Lamas (No. 4), 5996 metres (19,672 feet), a summit which is probably the Mount Puntagudo of the Chilian list, 5732 metres (18,806 feet), Los Patos Gap (No. 5), 4815 metres (15,797 feet), 4720 metres (15,485 feet), and Mount los Patos (No. 6), 5949 metres (19,518 feet). Plate XXXIII. represents Mount Patos and Mount Tres Cruces from the eastern depression. The line then runs by Pass of Aguita (No. 7), 4720 metres (15,485 feet), Mount Aguita (No. 8), 6279 metres (20,600 feet), Mount Tres Quebradas (No. 9, Plate XXXIV.), 6040 metres (19,817 feet) and 6280 metres (20,604 feet), Gap of Tres Quebradas (No. 10), 4735 metres (15,535 feet), another gap, 4840 metres (15,879 feet), Mount south of the gap, 5265 metres (17,273 feet), Valle Ancho Pass (No. 11), 4580 metres (15,026 feet), Mounts Dos Hermanas, 5500 metres (18,045 feet), 5260 metres (17,258 feet), Arroyo Pampa Pass (No. 12), 4720 metres (15,485 feet), Portezuelo Lagunilla (No. 13), 4950 metres (16,240 feet), Mount Lagunilla or Vidal Gormaz (No. 15), 4960 metres (16,273 feet), Mount La Gallina, 5370 metres (17,618 feet), Quebrada Seca Pass (No. 16), 4460 metres (14,632 feet), Mount Quebrada Seca Ensenadilla (No. 17), 5000 metres (16,404 feet), Peñazco de Diego Pass (No. 19), 4140 metres (13,582 feet), Mount Los Helados, 5370 metres (17,618 feet), Pircas Negras Pass (No. 20), 4150 metres (13,615 feet), Come Caballo Pass (No. 21), 4375 metres (14,355 feet), Mount Come Caballo (No. 22), 5320 metres (17,454 feet), Peña Negra Pass (No. 23), 4400 metres (14,435 feet) and Mount Peña Negra, 5230 metres (17,160 feet). Plate XXXV., Fig. 1 represents the panorama to the west of Come Caballo Pass, and Fig. 2 of the same Plate represents the part of the main chain, taken from the high plateau of Baboso, in which rise Mounts Baboso, Come Caballo, Peña Negra, the ridge from this Mount to Mount Patos and Mounts Cantarito and Tres Mogotes.

From Peña Negra the Cordillera de los Andes, towards the south, is divided into two chains, leaving between them a general longitudinal depression interrupted by volcanic action, either through elevating the adjacent ground, or else with their eruptive material. Of these two chains, the one on the east is intersected by several rivers which take their rise on its western slope. This is the eastern chain of the Cordillera de los Andes, as accepted by all geographers, including Señores Burmeister and Brackebusch. The other one is the *western boundary chain*, considered as such since the time of the Spanish Conquest, as far as 34° S. lat. In fact, the western chain to the north of 34° S. lat. is *the most elevated, the most continuous, the most uniform in general*

direction, and down its slopes flows the largest volume of water. The Argentine Experts have, therefore, considered it as the "main chain of the Andes," according to the Treaties;—and, based on the same reasons, to the south of 34° S. lat., where the eastern chain is the one which reunites those physical characteristics, they have traced the boundary along it. When both are intersected by a river having some of its springs in the eastern slope of the eastern chain,* the Argentine Expert has projected his line along that which presents less openings, according to the general principle adopted and to the letter and the spirit of the Treaty of 1881, and the Protocol of 1893.

This necessary explanation having been made, it becomes easy to follow the features along which the boundary line has been traced, and which have not been capriciously chosen by the Argentine Expert, as the Chilean Representative insinuates.

The last point which has been mentioned is Mount Peña Negra (No. 23), 5230 metres (17,160 feet). Near to this are Ollita Pass (No. 26), 4580 metres (15,026 feet), Mount Helados, 5030 metres (16,502 feet), Mount Medio Casquete, 4960 metres (16,273 feet), and the well-known Mount Potro (No. 28), 5900 metres (19,357 feet), after which follows Mount Tres Mogotes (No. 29), 5370 metres (17,818 feet), and Mount Piuquenes (No. 30), 5720 metres (18,766 feet), and between these the Pass of Macho Muerto (No. 31), 4800 metres (15,748 feet), Then come Pass del Inca (No. 32), 4750 metres (15,584 feet), near Mount Bravo, 5050 metres (16,558 feet), and Mount Rincón de la Flecha (No. 33), 5300 metres (17,388 feet), the immediate gaps of which are *No. 34,† 4750 metres (15,586 feet)*, No. 35, 4640 metres (15,223 feet), and 4600 metres (15,092 feet high). Here the two chains unite, the depression or longitudinal valley being interrupted.

The waters flowing down from the ridge just described from Peña Negra southwards form the river Blanco, which runs round the northern extremity of the eastern chain, then bends to the south and continues along its base, until it intersects a lateral eastern ridge, near 29° 40' S. lat. where it takes the name of river Jachal.

At the point where the two chains unite, Mount Bravo culminates in the

* It is only said eastern chain, because there are no rivers flowing down to the east from the western slope of the western chain.

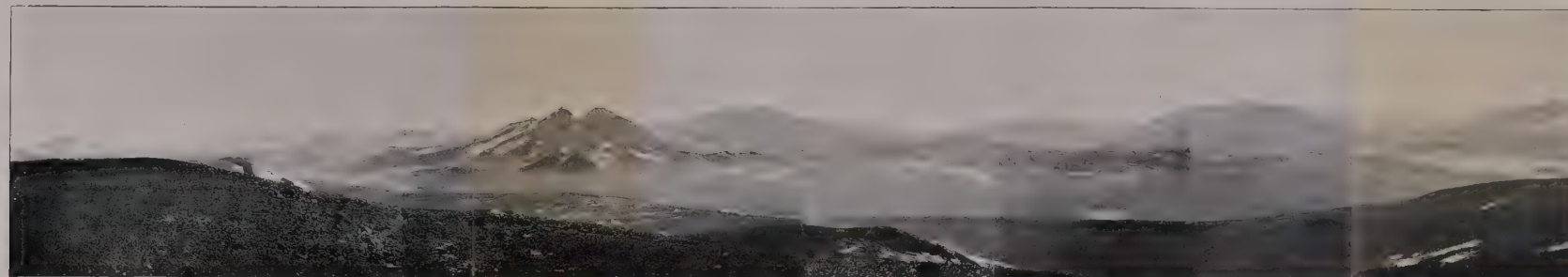
† The points of this enumeration printed in italics are represented in the figures inserted in the text.

Mount Juncal
(5813 m.; 19,072 f.)

Gap Pirca de Indios
(4890 m.; 15,059 f.)

Gap Malas Muertas
(4530 m.; 14,863 f.)

Mount Cenizo
(6640 m.; 21,785 f.)



MAIN CHAIN OF THE CORDILLERA DE LOS ANDES BETWEEN MOUNT JUNCAL OR WHEELWRIGHT AND MOUNT CENIZO, FROM THE WEST (at 5010 m.; 16,437 f.).

[Face p. 60]

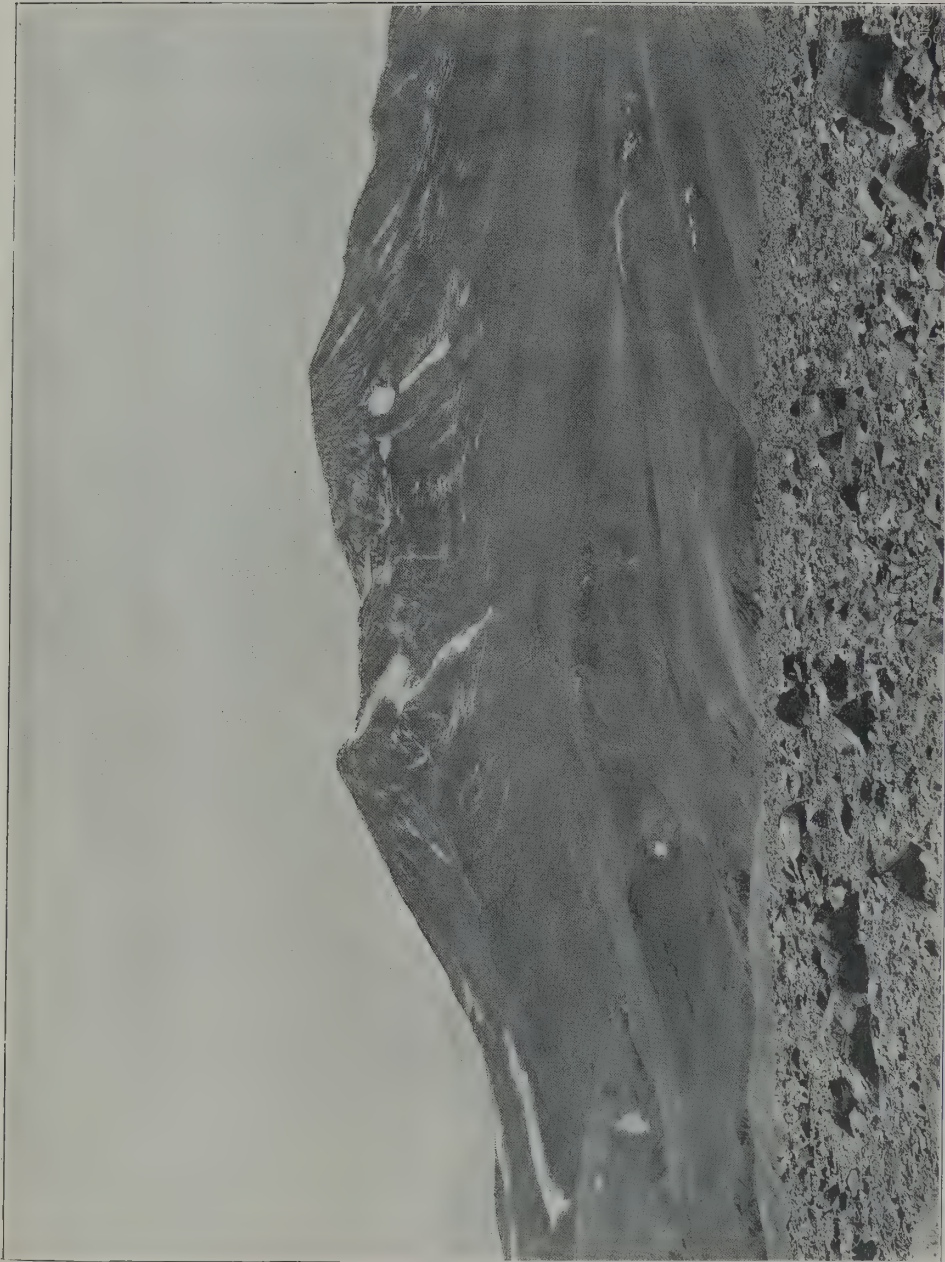
Mount Los Patos
(5949 m.; 19,518 f.)

Mount Tres Cruces
(6786 m.; 22,245 f.)



VIEW TAKEN FROM THE RIDGE (5510 m.; 18,078 f.) DIVIDING THE EASTERN DEPRESSION OF TRES CRUCES TO THE NORTH, FROM THE EASTERN DEPRESSION OF LAGUNAS VERDES TO THE SOUTH.

[Face p. 61]



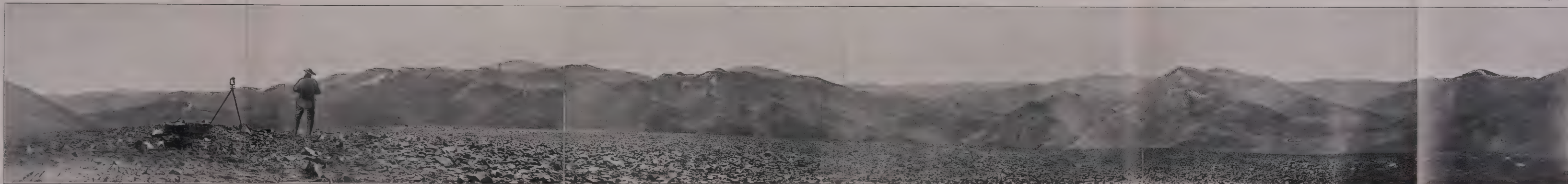
MOUNT TRES QUEBRADAS (6040 m.; 18,917 f.), FROM THE EAST.
Argentine landmark No. 9.

Mount Palila.
(5500 m.; 18,045 f.)

Mount Manduca.
(5100 m.; 16,929 f.)

Mount Pan Grande.
(5400 m.; 17,733 f.)

FIG. 1.



THE WESTERN RIDGES OF THE CORDILLERA DE LOS ANDES FROM PASS COME-CABALLO (4375 m.; 14,355 f.). Argentine landmark No. 21.

Mount Tres Mogotes.
(5370 m.; 17,818 f.)

Mount Patro.
(5900 m.; 19,357 f.)

Mount Come-Caballo.
(5320 m.; 17,454 f.)

Mount Baboso.

FIG. 2.

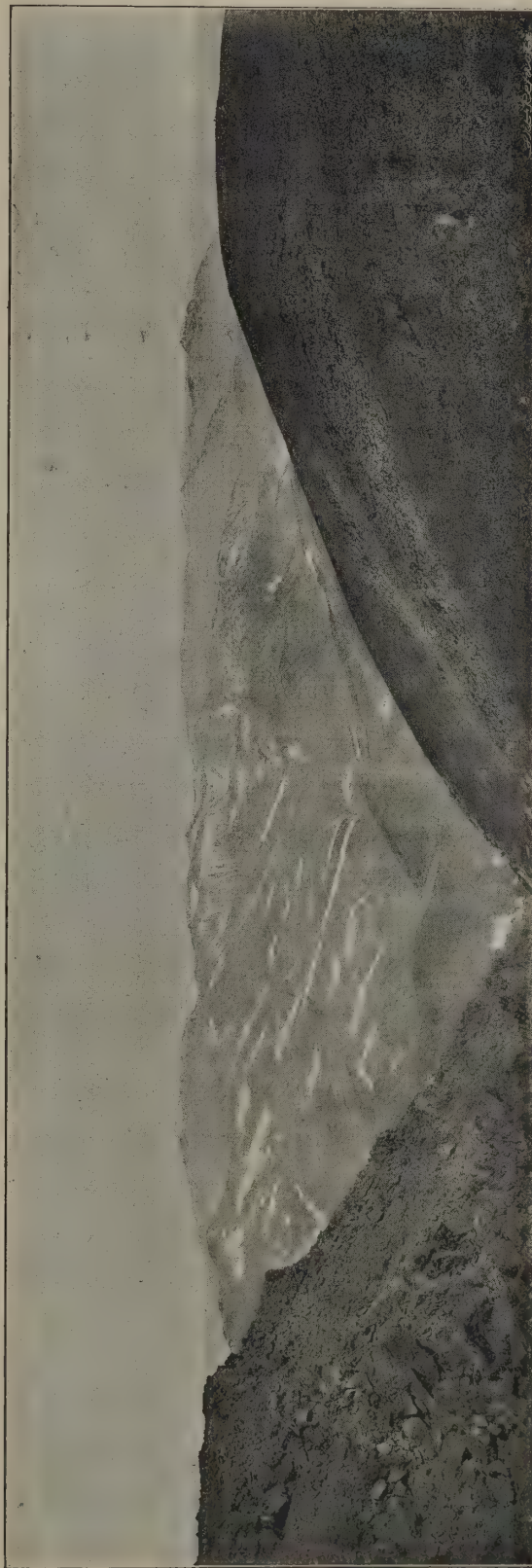


THE MAIN CHAIN OF THE CORDILLERA DE LOS ANDES FROM MOUNT BABOSO TO MOUNT TRES MOGOTES, FROM THE HIGH PLATEAU OF BABOSO (3740 m.; 12,271 f.).

[Face p. 601.]

eastern, 5050 metres (16,568 feet), and Mount Rincón de la Flecha in the western, 5300 metres (17,388 feet).

Following south, along the ridge of the western chain, the boundary line accepted by the Experts, are to be found Gap of the Flecha (No. 37), 4350 metres (14,271 feet), Gap of Mina de la Sal, 4326 metres (14,193 feet), and Mount Nevado de la Flecha, 5720 metres (18,766 feet). Mount Toro (No. 40), 5805 metres (19,045 feet), Gaps of Valeriano (No. 41), 4093 metres (13,429 feet), Soberado (No. 42), 4027 metres (13,212 feet), Chollay (No. 43), 4377 metres (14,361 feet), Las Amarillas (No. 44), 4251 metres (13,947 feet), Chivato (No. 47), 4300 metres (14,108 feet), and Guanaco Sonso (No. 48), 4335 metres (14,222 feet). At the foot of Mount Sancarron (No. 50), 5185 metres (17,011 feet), and adjacent to Mount Chivato, 5038 metres (16,529 feet), the line follows over Mount Deidad, 5301 metres (17,392 feet), and the neighbouring Deidad Pass (No. 53), 4780 metres (15,682 feet), after which the boundary ridge continues with summits of 4882 metres (15,820 feet), and 5094 metres (16,712



THE WESTERN RIDGES OF THE CORDILLERA, FROM THE GAP RINCÓN DE LA FLECHA (4750 m.; 15,586 f.).
Argentine landmark No. 34.

feet) as far as Mount Pedernal, 5200 metres (17,060 feet), at the foot of which is the *Pass Vacas Heladas* (No. 54), 4955 metres (16,256 feet), dominated to the south, by the mount of the same name, 5500 metres (18,044 feet), and another mountain without name, 5350 metres (17,552 feet).

To the south of the Pass Vacas Heladas, there are that of *Tórtolas* (No. 56), 4883 metres (16,020 feet), *Mount Tórtolas* (No. 57), 6133 metres (20,121 feet), *Gap Lagunita* (No. 58), 4842 metres (15,886 feet), and Mount Potrero Seco, 5660 metres (18,569 feet). At this point the longitudinal depression, which runs along between the two chains, from La Flecha to the south, is again interrupted.



PASS VACAS HELADAS (4955 m. ; 16,256 f.).

Argentine landmark No. 54.

(From a photograph of the Chilian Boundary Commission.)

This depression collects all the waters of the eastern slope of the western boundary chain, from the vicinity of Mount Flecha, for an extent of one degree and a half of latitude, and these waters forming the rivers de la Sal and Cura, intersect the eastern chain in Teno gorge and join with those of the above-mentioned river Blanco.

This fragmentary chain does not present the salient features of the western with the two only exceptions of the heights of 5240 metres (17,191 feet) and 5150 metres (16,897 feet), mentioned in the Chilian list.

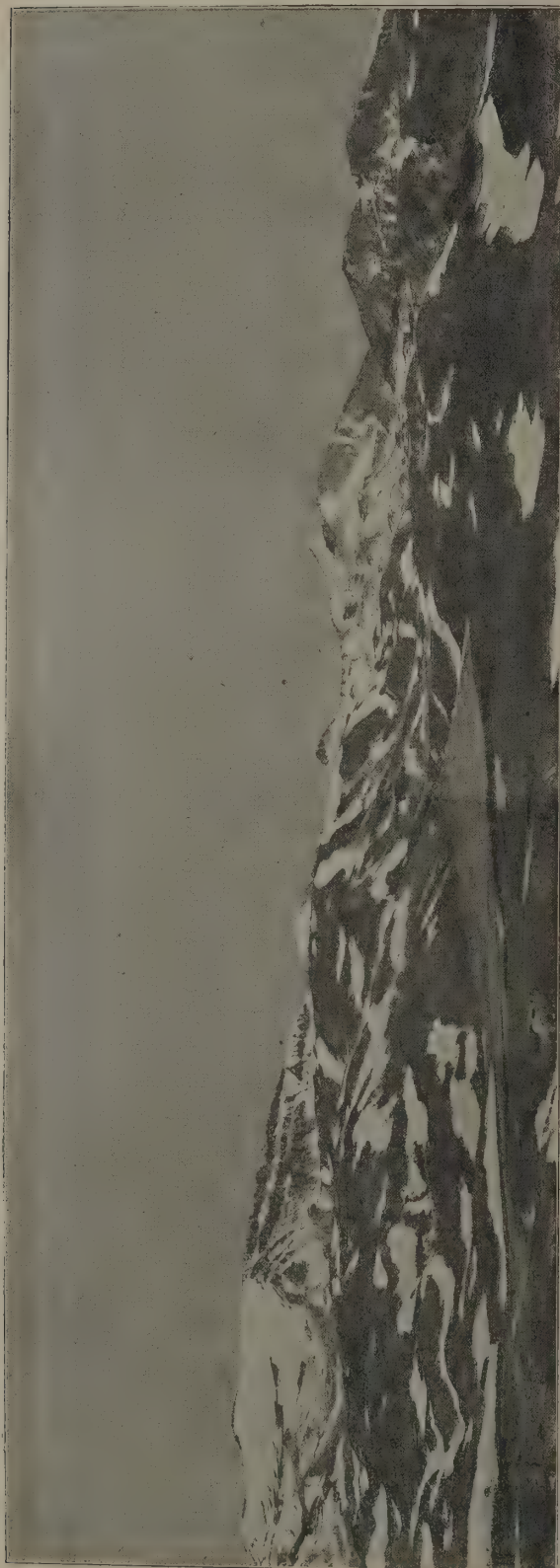
To the south of Mount Potrero Seco, the western chain continues massive and high, containing the snow-caps of Tia Pechona and Porongos, 5940 metres (19,488 feet), and is separated from the eastern chain by the continuation of the longitudinal depression which is prolonged and shut in by imposing gorges or accessible valleys.

Between Mount Potrero Seco and the confluence of the river San Francisco with the river Las Leñas, the eastern chain bears the name of *Cordillera de Olivares* and is of considerable altitude, attaining to 6000 metres (19,685 feet) in



TÓRTOLAS GAP (4883 m. ; 16,020 f.).
(From a photograph of the Chilian Boundary Commission.)
Argentine landmark No. 56.

the point of union of the two chains. Between Mount Potrero Seco and the Pass of Barahona, or Varona, referred to by the Chilian Representative, there are the following principal crests and gaps :—Mount Bañados (No. 59), 5330 metres (17,487 feet), *gap or pass of Agua Negra* (No. 60), 4800 metres (15,748 feet), Mount Olivares (No. 61), 5930 metres (19,455 feet), 6240 metres (20,472 feet), 5980 metres (19,619 feet), Pass of Gloria, where part of the Argentine army crossed over in 1817, 4400 metres (14,435 feet), neighbouring summit, 4830 metres (15,826 feet), Gap of River Blanco (No. 64), 4950 metres (16,240 feet),



MOUNT TORTOLAS (6133 m.; 20,121 f.), FROM THE SOUTH OF LAGUNITA GAP.
Argentine landmark No. 57.

Pass San Lorenzo (No. 65), 5005 metres (16,420 feet), neighbouring peak, 5135 metres (16,847 feet), Passes of River Seco (No. 66), 4260 metres (13,976 feet) and 4520 metres (14,829 feet), Pass Vallecito (No. 67), 4700 metres (15,420 feet), Pass del Ternero (No. 68), 4850 metres (15,912 feet), dominated by Mount Volcan, 5530 metres (18,143 feet), Paso de Barahona or Varona (No. 69), 4600 metres (15,092 feet). Near to this pass is Mount San Francisco, the two peaks of which are 5460 metres (17,913 feet) and 5365 metres (17,602 feet) high.

The line from Pass of Barahona follows along Pass of Santa Rosa (No. 70), 4250 metres (13,943 feet), Pass Castillo (No. 71), 4180 metres (13,714 feet), Pass Miranda (No. 72), 4275 metres (14,026 feet), Pass Viento (No. 73), 4340 metres (14,239 feet), Pass Vientecillo (No. 74), 4350 metres (14,271 feet), Summit of Vientecillo, 4920 metres (15,813 feet), Passes Guana (No. 75), 4320 metres (14,173 feet), Portillo (No. 76), 4030 metres (13,222 feet), Valle Hermoso (No. 77), 4310 metres (14,140 feet), Delgado (No. 78), 4145

metres (13,600 feet), Azules (No. 81), 3920 metres (13,599 feet), Gordito (No. 82), 3670 metres (10,318 feet), De la Coipa (No. 85), 4040 metres (13,254 feet), Calderon (No. 92), 3715 metres (12,188 feet), Azufre (No. 93), 3660 metres (12,008 feet), Negro (No. 95), 3960 metres (12,992 feet), Burros (No. 96), 4330 metres (14,206 feet), Los Leones (No. 100), 4070 metres (13,353 feet), Chalinga (No. 102), 3925 metres (12,877 feet), Pachon (No. 103), 4415 metres (14,485 feet), Mount Pachon, 5440 metres (17,848 feet), Passes Tungue, 4535 metres (14,878 feet), Mondaca (No. 104), 4000 metres (13,123 feet), Salitre (No. 105) 4190



THE MAIN CHAIN FROM THE SOUTH OF THE LAGUITA GAP.

(4842 m.; 15,886 f.).

Argentine landmark No. 58.

metres (13,746 feet), Ojota (No. 107), 4360 metres (14,304 feet), *Mercedario* (No. 108), 4025 metres (13,206 feet), *Cencerro or Gredas* (No. 109), 3945 metres (12,944 feet), Teatinos (No. 111), 3415 metres (11,204 feet), Quebrada Grande, 3800 metres (12,468 feet), Yaretas (No. 112), 3275 metres (10,745 feet), La Honda, 4150 metres (13,616 feet), Longomicha, 4400 metres (14,436 feet), and Valle Hermoso (No. 114), 3577 metres (11,736 feet), which is represented in Plate XXXVI,—crest between this pass and the Gap of Quebrada Honda, 4900 metres (16,077 feet), *Gaps of Quebrada Honda* (No. 115), 4295 metres (14,085 feet), and Rubio (No. 116), 4033 metres (13,232 feet), Passes of Leiva

(No. 117), 4440 metres (14,436 feet), and Volcan (No. 118), 4710 metres (15,454 feet).

Volcan Pass is to the W.N.W. of Mount Aconcagua, 7730 metres (23,392 feet), which rises between the western and eastern chain, the eastern one being represented, in this latitude, by the Cordillera del Tigre, which has never been considered as a boundary.

All the waters between the Passes of Valle Hermoso and Volcan flowing down the eastern slope of the main chain, form the river Volcan, which is the principal southern tributary of the river Patos.



THE MAIN CHAIN OF THE CORDILLERA AT THE COMMENCEMENT OF
THE RIDGE OF OLIVARES.

The valley de los Patos has been claimed for a long time by Chile, and, as it has been already stated, several conflicts have taken place in regard to it between the authorities of the two countries. This is one of the clearest proofs that in the opinion of the Chilean Government the boundary was to run along the Cordillera de los Andes, and not along the continental water-parting, since they claimed to extend their territory as far as the eastern chain through the Espinacito Gap, and cutting the river Patos where it intersects the eastern chain. It is not possible to allege that the geographic conditions of the place were unknown, as it is one of the most frequented in the Cordillera, and near to the most populous centres of Chile, it being through this region



VALLE HERMOSO GAP (3577 m.; 11,736 f.).
Argentine landmark No. 114,

that in 1817 the Argentine army crossed "to fight the Spaniards and deliver Chile." *

The large geographical map of Pissis depicted the international frontier in the Pass of Valle Hermoso, *in the western chain*, but the Chilian Government, in spite of this map, and of the Argentine protests, continued, until 1893, to claim this valley, and although it was situated to the east of the principal chain dividing the waters of the Cordillera de los Andes in this part, Chile considered it of doubtful jurisdiction. Her Government solicited from the Argentine



AGUA NEGRA GAP (4800 m., 15,748 f.).

Argentine landmark No. 60.

Government that the Province of San Juan should suspend the recovery of taxes in that valley, giving thus, with that official declaration, a thorough proof that

* Thomas Carlyle in his *Critical and Miscellaneous Essays*, London, 1857, vol. 4, says:—P. 251.—“South American armies think little of picking their ways through the gullies of the Andes. So the Buenos Aires people, having driven out their own Spaniards and established the reign of freedom, though in a precarious manner, thought it were now good to drive the Spaniards out of Chile, and establish the reign of freedom there also instead; whereupon San Martin, Commander at Mendoza, was appointed to do it.” P. 252.—“Through this kind of country did San Martin march, straight towards Santiago, to fight the Spaniards and deliver Chile.”

the frontier line must cut rivers, as the river Patos crosses the eastern chain, carrying off the waters of the valley, while the general watershed of the Cordillera is situated on the western range.*

* On January 25, 1893, the Chilean Plenipotentiary at Buenos Aires, Señor Adolfo Guerrero, addressed to the Argentine Minister for Foreign Affairs a communication, in which he said :—

“Allow me to request your Excellency’s kind consideration of a Memorial made in the name of a Chilean citizen and sent to me by the Minister for Foreign Affairs, with regard to the recovery of a land tax, of a revenue nature on an estate situated in the valley of Los Patos, near the District of Calingasta, Province of San Juan.

“The present proprietor of this estate is Don Francisco Subercaseaux, a citizen of Chile, who acquired it by purchase to the heirs of Don Juan Rozas, as a part—if my private information is correct on that point



MOUNT MERCEDARIO AND MERCEDARIO PASS (4025 m. ; 13206 f.).

Argentine landmark No. 108.

—of a very valuable estate in the District of Putaendo, Province of Aconcagua, Republic of Chile, near the District of Calingasta.

“An intimation issued by Señor Juez de Paz of Calingasta has come into the hands of Señor Morel, the agent of Señor Subercaseaux, who is at present living in Europe, by which the heirs of Don Juan Rozas are informed that the Collector of Revenue has brought a writ of seizure against the tract of land called the Southern Valley of Los Patos, the estate of Señor Rozas, to secure to the Treasury the payment of the sum of one hundred and fifty-nine dollars and fourteen cents (\$159·14) for arrears of land tax, the said heirs being notified that within the period of thirty days they must appear before the Justice of the Peace of their District and pay the amount, in addition to the costs of the collection, over and above interest or fines which may be incurred up to date of payment, under penalty of seizure of the ground referred to, and its sale by auction.

“Señor Morel has expressed to the Judge, that he does not consider that he owes any sum whatever to the Argentine Treasury, as he believes the so-called Valley of Los Patos to be in Chilean territory, and that

After the Pass of the Volcan, the line follows along the high ridge of Cuevas Pass (No. 119), 4819 metres (15,810 feet), in the eastern slope of which is the source of the river Cuevas, the western tributary of the river Mendoza, and by a steep ridge, and passing through the Gaps Contrabandistas (No. 121), 4436 metres

there would be occasion for paying the sum claimed only in case the International Commission, established to settle the difficulties which have arisen in regard to the fixing of the boundary between Chile and the Argentine Republic, should decide said valley to belong to the Argentine Republic, and that in the meantime the present *statu quo* should be maintained.

"At the same time Señor Morel has brought the foregoing facts to the knowledge of the Minister for Foreign Affairs of my country, and, the matter having been turned over to it, the Department has deputed me to address Your Excellency in the most friendly terms, setting forth what has really happened in the matter,



MOUNT "ALMA NEGRA DEL MERCEDARIO."

and stating that the Government of Chile will see the *statu quo* preserved in this valley with pleasure until such time as the Experts determine its nationality, the claim made to be subordinated to this resolution.

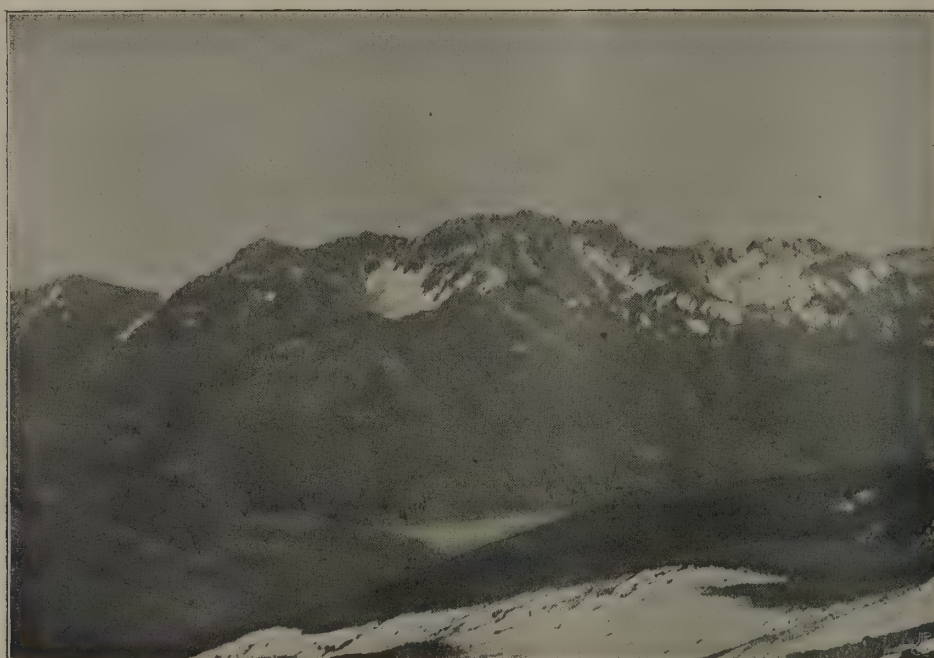
"Similar remarks may be made with regard to another claim which is being made on sundry estates of the District of Ovalle, Province of Coquimbo, of a tax on stock grazing, established by enactment of the Legislature of the Argentine Province of San Juan bearing date of December 24, 1891, and which must be paid on moving the cattle out of the province.

"The collection of this tax in the Valley of Los Patos, where are also the estates whose owners have opposed the payment of this tax, would alter the *statu quo* which both Governments have agreed to maintain in the districts whose boundaries were referred by the Treaty of 1881 to the Experts, who have already begun the execution of their high mission."

The Argentine Minister for Foreign Affairs answered this note on January 26, 1893, in the following terms:

"I had the honour of receiving Your Excellency's confidential communication of yesterday's date, in which you were good enough to draw the attention of this Ministry to the recovery of the land tax, of a revenue

(14,557 feet) and Escondido (No. 122), 4073 metres (13,336 feet), it follows to the Passes La Iglesia (No. 123), 3843 metres (12,608 feet), and Bermejo (No. 124), 3885 metres (12,746 feet), the best known in the Cordillera de los Andes, in the road of the Cumbre, through which the explorers sent by Diego de Almagro passed in the sixteenth century, to the eastern lands, and through which the Transandine Railway will cross before long. Plate XXXVII. represents the main chain, on the section showing Mounts Aconcagua, Almacenes, Bonete, Tolorsa, and Passes Iglesia, Bermejo and Navarro.



MOUNT CENCERRO AND CENCERRO GAP (3945 m. ; 12,944 f.).

Argentine landmark No. 109.

All the travellers who have crossed these gaps, recognised them to be the boundary line between the Argentine Republic and Chile. The idea of a gigantic crest which separates, like an impassable wall, the two jurisdictions, has arisen from the frequenting of the road between Uspallata on the eastern and

nature, on an estate in the 'Valley of Los Patos,' and likewise in the same manner to the tax levied on stock grazing, on moving the cattle out of the territory of the San Juan Province.

"In informing Your Excellency that I have applied to the Government of said province asking them to kindly send me all information relating to the case, I beg to repeat to Your Excellency the assurance of my most distinguished consideration."

Nacuco Gap
(4171 m.; 13,684 f.)

Gap Bermejo Iglesas
(3885 m.; 12,746 f.) (3843 m.; 12,608 f.)

Talara
(5900 m.; 19,358 f.)

Mount Bonet

Mount Almaguer

Mount Aconcagua
(7130 m.; 23,393 f.)



VIEW OF THE MAIN CHAIN OF THE CORDILLERA, FROM THE RIVER MENDOZA OR CUEVAS.



Engraved by Russell & Sons, Sydney, N.S.W.

JOHN MIERS, 1826. (From Travels in Chile and La Plata.)

Santa Rosa on the western side, and it is not necessary to dilate on the suitability of this boundary. The two narrow valleys which terminate in this ridge, have given passage to hundreds of thousands of travellers, and certainly, not one of them has ever considered that the boundary between the two countries, the summit of the Cordillera he was crossing, was a hydrographical boundary. The high mountain range with its formidable peaks and depressions, stands forth as a frontier, and not by any means, the small streams which run down the two sides of its steep



QUEBRADA HONDA GAP, LOOKING TO N.E. (4295 m. ; 14,085 f.).

Argentine landmark No. 115.

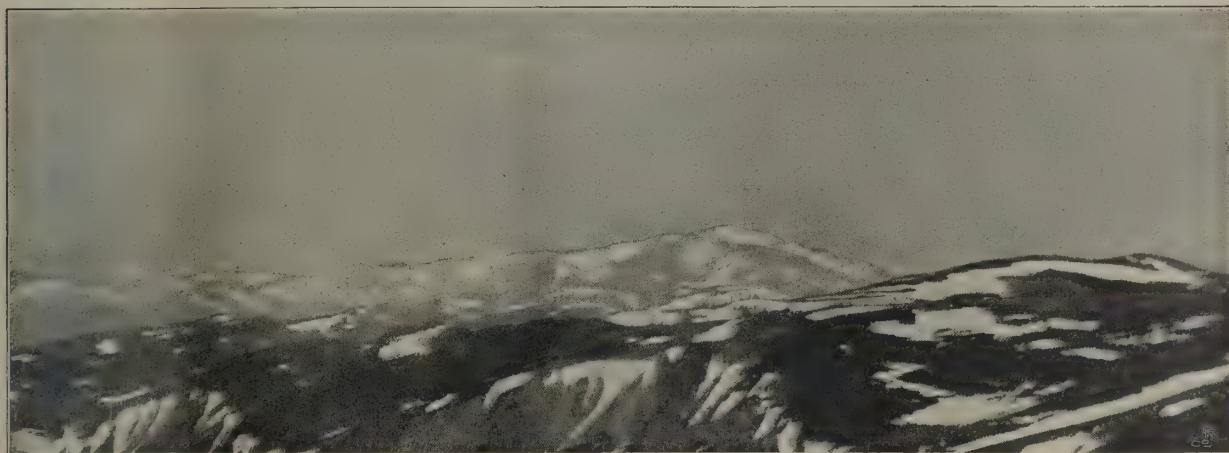
slopes. When the traveller crosses the gap, in its summit, he has crossed the Cordillera de los Andes, which name is given to its main chain, from the earliest times, as can be seen from the map of Miers which is reproduced here in facsimile.

Darwin, who traversed the Cordillera by these same gaps, describes them * in a way that renders superfluous any other comment. He says:—

* Narrative of the Surveying Voyages of Her Majesty's ships 'Adventure' and 'Beagle,' Journal and Remarks by Charles Darwin, London, 1839, vol. 3.

P. 311.—“Chile, as may be seen in the maps, is a narrow strip of land *between the Cordillera and the Pacific*; and this strip is itself traversed by several mountain lines, which in this part run parallel to the *great range*. Between these outer lines, and the *main Cordillera*, a succession of level basins generally open into each other by narrow passages, extend far to the southward.”

P. 314.—“We spent the day *on the summit*, and I never enjoyed one more thoroughly. *Chile bounded by the Andes and the Pacific* was seen as in a map. . . . The appearance of the Andes was different from that which I had expected. The lower line of the snow was of course horizontal, and to this line the even summits of the range seem quite parallel. Only at long intervals a mass of points, or a single cone, showed where a volcano had existed or does now exist. Hence the range resembled a great solid wall, surmounted here and there by a tower, *and thus made a most complete barrier to the country.*”



THE MAIN CHAIN OF THE CORDILLERA, FROM LOS PATOS VALLEY.

The Argentine line in its whole extent leaves to Chile “*between the Cordillera and the Pacific*,” leaves to “*Chile bounded by the Andes and the Pacific*,” as it has been traced along that “*great range*,” along that “*main Cordillera*,” which makes “*a most complete barrier to the country.*”

Near these Passes are Mount Tolorsa and Juncal, the summits of which exceed 5900 metres (19,358 feet) and 6100 metres (20,014 feet); both situated in the main chain of the Andes. To the south of “La Cumbre” follows the Gap of Navarro, 4171 metres (13,684 feet), and then continues the high and inaccessible edge with snow-capped mountains from 5900 metres (19,357 feet) to 6000 metres (19,685 feet) until Pircas Pass (No. 128, Plates XXXVIII. and XXXIX.), 4898 metres (16,070 feet), near to Mount Polleras (No. 131), 6235 metres (20,266 feet), represented in Plate XL., and *Morado Gap* (No. 129), 5070 metres (16,636 feet), at the foot of Mount Chimbote (No. 130), 5633 metres (18,645 feet).

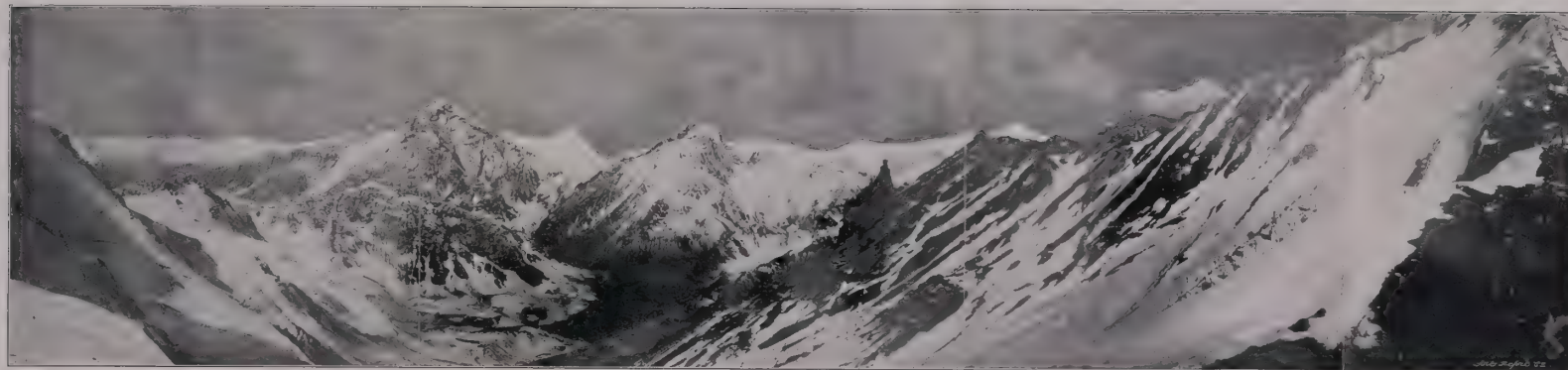
Then follow Tupungato Gap (No. 132), 4800 metres (19,029 feet), represented in Plate XLI., Mount Tupungato (No. 133), 6830 metres (22,408 feet), Bravard Volcano (No. 134), 5980 metres (19,619 feet), Mount Piuquenes (No. 135), 5435 metres (17,815 feet), Piuquenes Gap (No. 136), 4030 metres (13,222 feet), Volcano San José (No. 139), 6050 metres (19,849 feet), pass of Nieves Negras (No. 140), 3910 metres (12,928 feet), Colina Gap (No. 141), 4080 metres (13,386 feet), a snow-capped peak without any name (No. 142), 5650 metres (18,537



MORADO GAP (5070 m.; 16,636 f.).

Argentine landmark No. 129.

feet), Mount Gorro (No. 143), 5100 metres (16,732 feet), Mount Amarillo (No. 144), 4670 metres (15,321 feet), Mount Alvarado (No. 145), 4450 metres (14,600 feet), Alvarado Pass (No. 146), 3905 metres (13,811 feet), Alvarado south (No. 148), 3789 metres (12,431 feet), and the *Volcano Maipu* (No. 149), 5331 metres (17,490 feet). Plate XLII. represents the snowy ridge of the main chain to the south of Volcano Maipu. The line follows by Pass Maipu (No. 150), 3485 metres (11,433 feet), Bayo Gaps (No. 151), 3900 metres



LAS PIRCAS GAP (8998 m.: 16,070 f.), FROM THE ARGENTINE SIDE.
Argentine landmark No. 128.

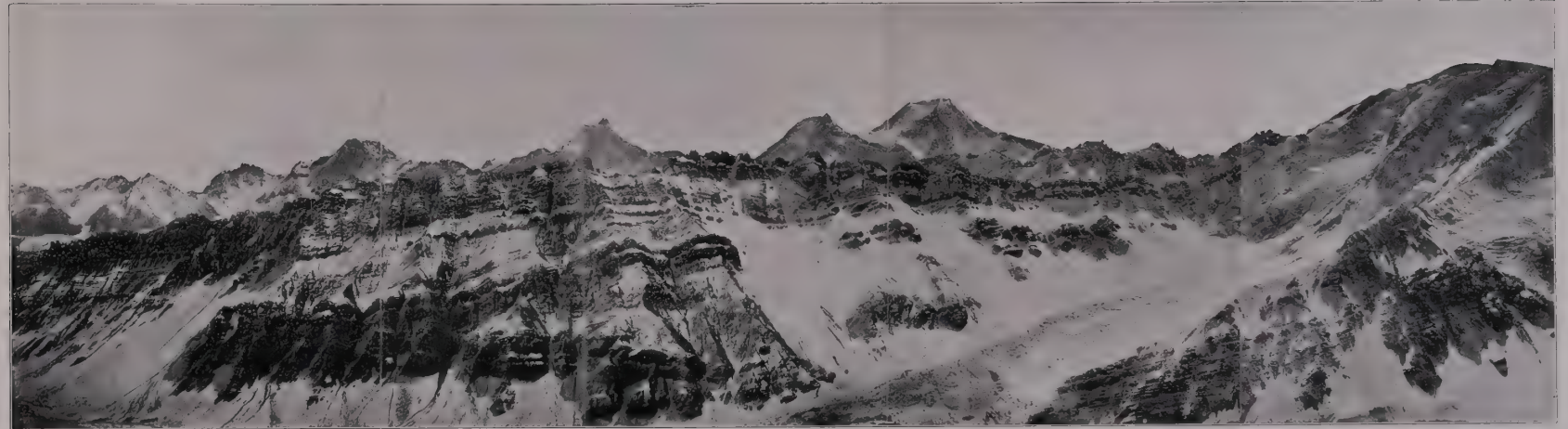


LAS PIRCAS GAP (4898 m.; 16,070 f.), FROM THE CHILIAN SIDE.

Argentine landmark No. 128.

Mount Chimborazo
(5633 m. ; 18,645 f.)

Mount Polleras
(9235 m. ; 20,266 f.)



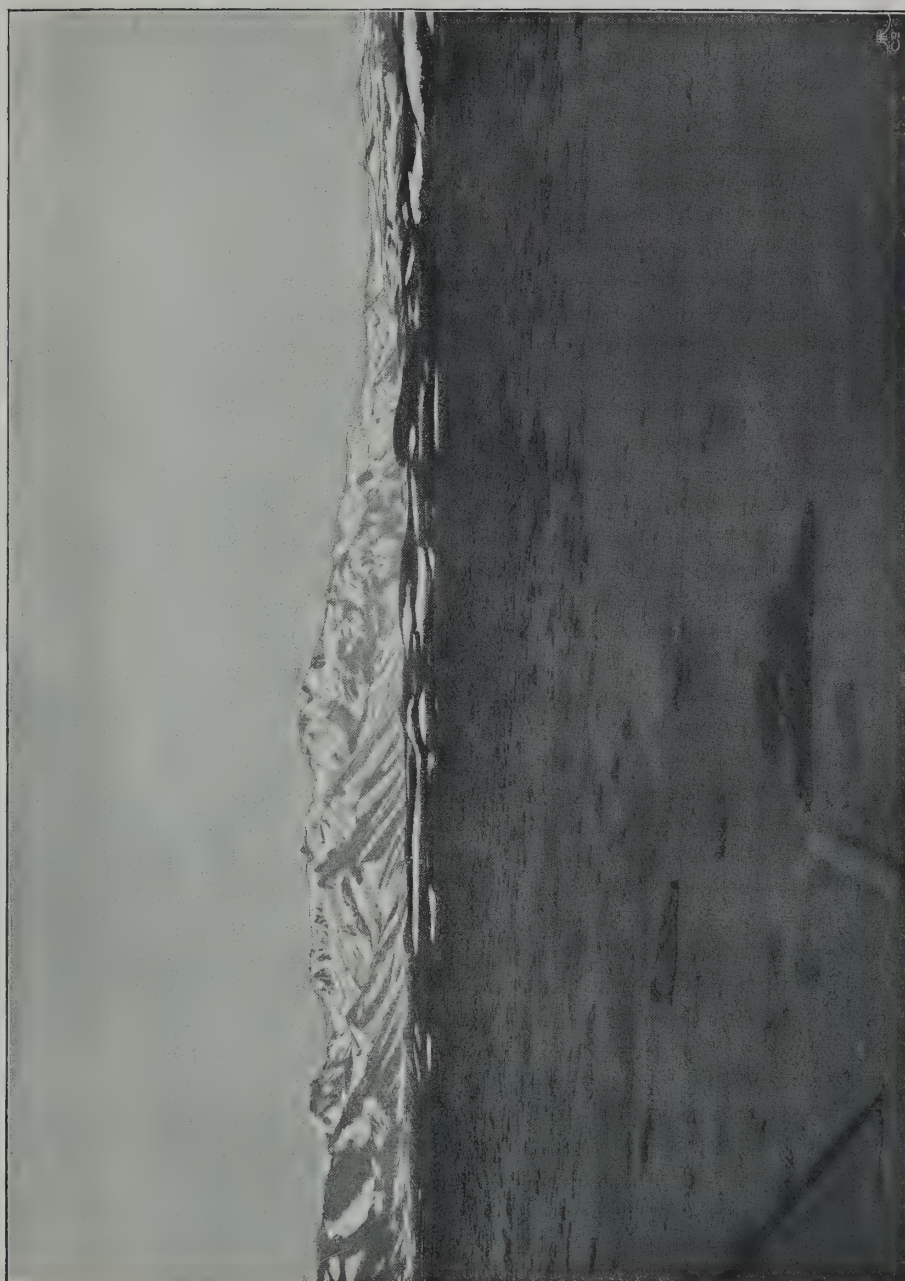
MAIN CHAIN OF THE CORDILLERA DE LOS ANDES, SHOWING MOUNTS CHIMBOTE AND POLLERAS.
Argentine landmarks Nos. 130 and 131.

Mount Bravard
(5980 m.; 19,619 f.)
Landmark No. 134.

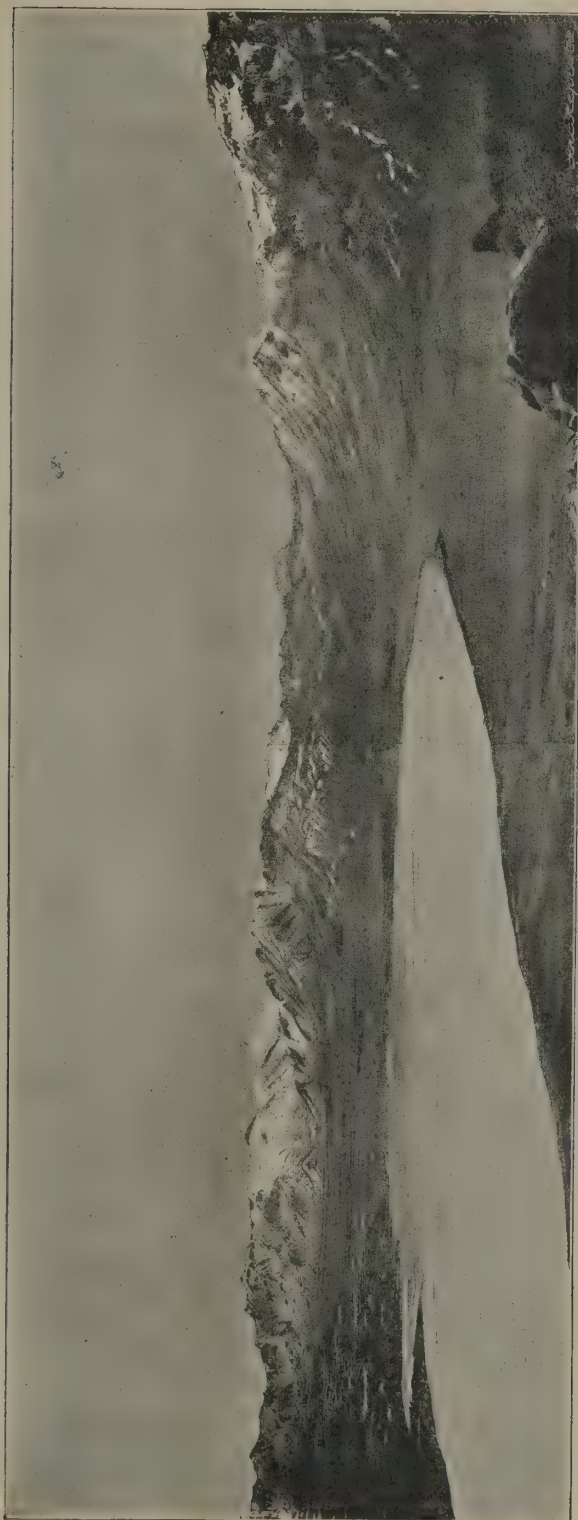
Mount Tupungato
(6830 m.; 22,408 f.)
Landmark No. 133.



TUPUNGATO GAP (4800 m.; 19,029 f.)
Argentine landmark No. 132.



THE HIGH LAVA PLATEAU OF MAIPU VOLCANO (5331 m.; 17,490 f.)
AND THE MAIN RIDGE TO THE SOUTH.



LAGUNA DIAMANTE AND THE MAIN RIDGE OF THE CORDILLERA TO THE NORTH
OF MAIPU VOLCANO.

(12,762 feet), (No. 152), 3995 metres (12,779 feet), and (No. 153), 4036 metres (13,241 feet), Mount Bayo (No. 154), 4990 metres (16,371 feet), Pass of Cruz de Piedra (No. 156), 3918 metres (12,857 feet), Mount Castillo, 5040 metres (16,535 feet), with summits on the same edge of 4430 metres (14,534 feet), and 4534 metres (14,875 feet), Molina Gap (No. 157), 4320 metres (14,173 feet),—which is represented in Plate XLIII.—Mount Atravieso (No. 158), 4610 metres (15,124 feet), and Las Leñas Gap (No. 159), 4010 metres (13,156 feet), which is represented in Plates XLIV. and XLV. Between this Gap and the *Lagunas Gap*, 3940 metres (12,926 feet), there are several points of the ridge which rise between 4500 metres (14,764 feet), and 5000 metres (16,404 feet) high, and near to the gap there is one of 4620 metres (15,137 feet), and another of 4570 metres (14,993 feet).

Upon this same principal chain there is the Volcano Tinguiririca, 4500 metres (14,765 feet), and *Las Damas Pass* (No. 161), 2900 metres (9514 feet).

Then the ridge continues through Mount Santa Helena (No. 162), 3251 metres (10,666 feet), Santa

Helena Pass (No. 163), 3047 metres (9996 feet), Tiburcio Pass (No. 164), 2916 metres (9567 feet), points of the edge of 3202 metres (10,505 feet), and of 3251 metres (10,667 feet), Vergara Passes (No. 165), 2898 metres (9508 feet), 3020 metres (9908 feet), Planchon Pass (No. 167), 2922 metres (9586 feet), Mount Planchon (No. 168), 3890 metres (12,762 feet), and 3910 metres (12,828 feet), Mount Azufre (No. 169), 3774 metres (12,382 feet), Mount Peteroa (No. 170), 4053 metres (13,297 feet), Mount Peñon (No. 171), 3403 metres (10,164 feet), Valenzuela Pass (No. 172), 2498 metres (8195 feet), Valle Grande Pass (No. 173), 2588 metres (7490 feet).



LAGUNAS GAP (3940 m. ; 9514 f.).

Plate XLVI., Fig. 1, represents the Cordillera from Mount Santa Helena to the south of Mount Planchon and shows Mounts Azufre and Peteroa.

After Mount Peñon the ridge which divides the waters of the main chain bends to the east of the high mountains of the said chain, partly as a result of the erosion which is greater on the western side, on account of the heavier rainfall, and partly on account of the activity of this group of volcanoes even in the present century. Notwithstanding this fact the western chain continues to be the boundary as the eastern chain is depressed, bends to the east, and is intersected continually by streams which rise in the main chain.



SOURCES OF RIVER CAUQUENCITO AT MOLINA GAP (4320 m.; 14,173 f.).

Argentine landmark No. 157.

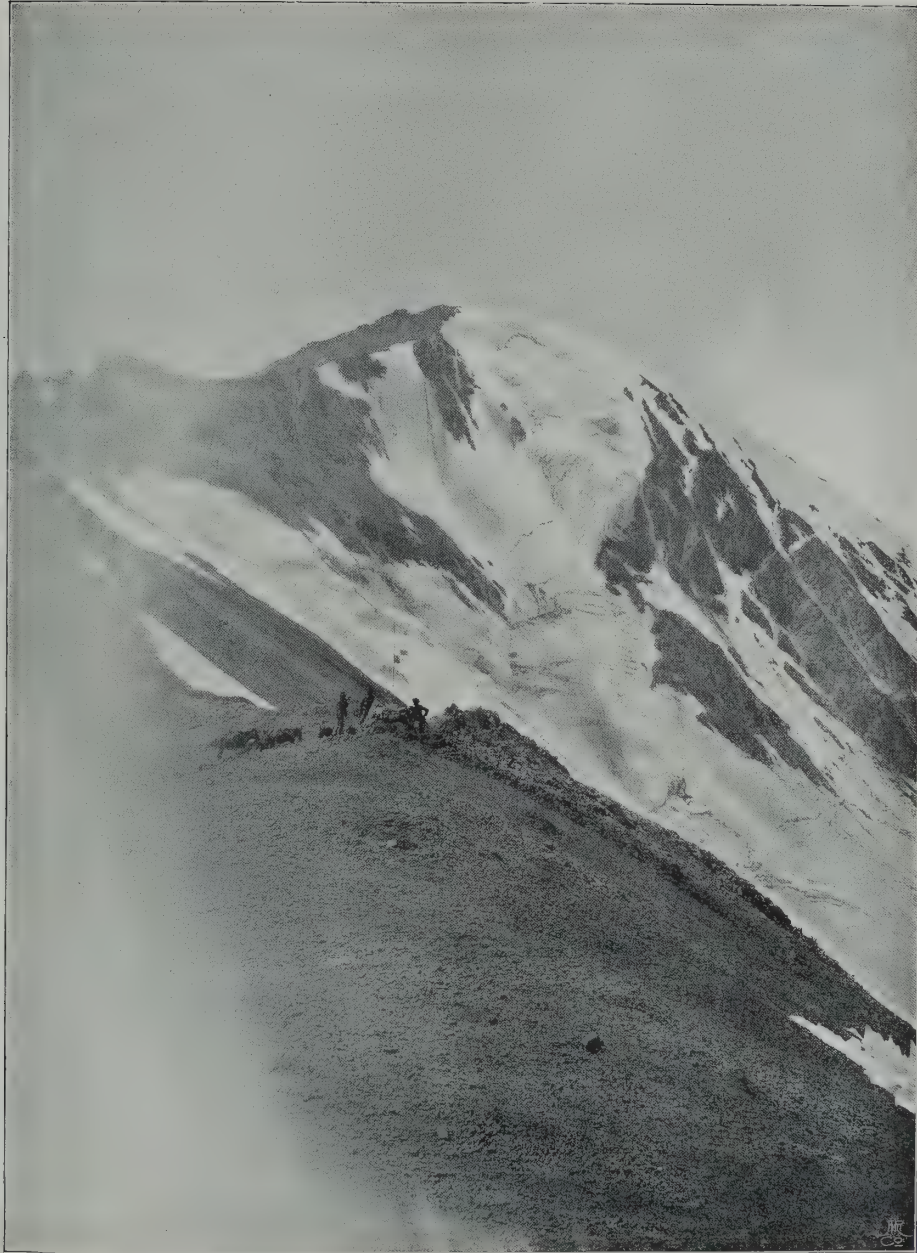
(From a photograph of the Chilean Boundary Commission.)



LAS LEÑAS GAP (4010 m.; 13,156 f.).

Argentine landmark No. 159.

(From a photograph of the Chilean Boundary Commission.)



THE MAIN CHAIN OF THE ANDES.

Argentine landmark at Las Leñas Gap, No. 159 (4010 m. ; 13,156 f.).

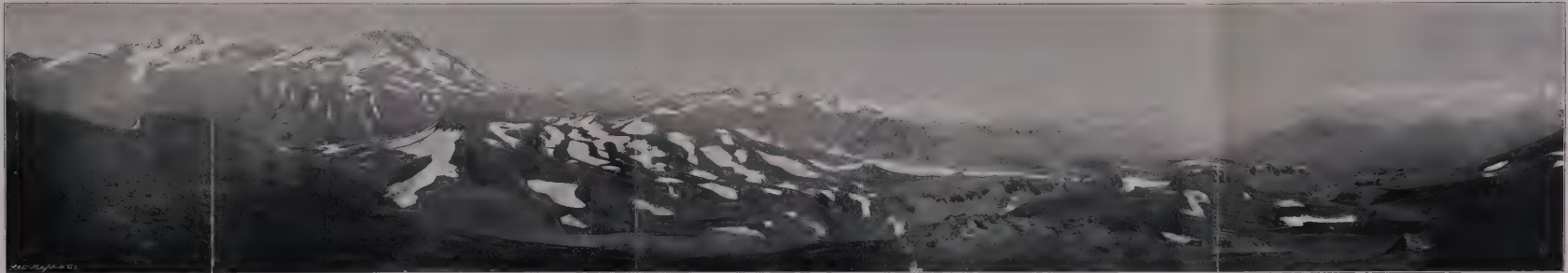
(From a photograph of the Chilean Boundary Commission.)

ARGENTINE-CHILIAN BOUNDARY QUESTION.

Mount Peteroa. (4653 m.; 15,297 f.)
Mount Azafrán. (3774 m.; 12,382 f.)
Mount Planchón. (3910 m.; 12,825 f.)

Mount Santa-Heleña. (3251 m.; 10,696 f.)

FIG. I.



THE MAIN CHAIN OF THE CORDILLERA DE LOS ANDES FROM MOUNT SANTA-HELENA TO MOUNT PETEROA.

Argentine landmarks, Nos. 162 to 170.
(Photograph taken from the East.)

FIG. II.



Rio Bio Valley.

Mount Longinus. (2867 m.; 9406 f.)

Mount Cautín. (2294 m.; 7526 f.)

Isail Mahuida.

Mount Ventiguera or Palal. (2715 m.; 8907 f.)

THE BIFURCATION OF THE CORDILLERA DE LOS ANDES.

The boundary line continues over the ridge of the main chain, the principal summits and gaps of which are Passes Fierro (No. 175), 3050 metres (9957 feet), Devis (No. 176), 2850 metres (9350 feet), Montañez (No. 178), 2900 metres (9514 feet), Mount Mora (No. 180), 3540 metres (11,614 feet), Passes San Francisco (No. 184), 2957 metres (9701 feet), Pichi-Trolon (No. 189), 3090 metres (10,137 feet), Overas (No. 190), 3142 metres (10,308 feet), Cajon Grande (No. 191), 3400 metres (11,155 feet), Mount Campanario (No. 192), 4005 metres (13,140 feet), Passes Maule or Pehuenche (No. 194), 2690 metres (8825 feet), Guanaco (No. 195), 2674 metres (8773 feet), summit without any name (No. 196)



PASS OF LAS DAMAS, IN THE MAIN CHAIN OF THE CORDILLERA
(2900 m. ; 9514 f.).

Argentine landmark No. 161.

3215 metres (10,548 feet), Passes Barrancas (No. 198), 2674 metres (8773 feet), and Sepúlveda (No. 199), 2605 metres (8546 feet), summit without any name, 3075 metres (10,088 feet), Pass Laguna Fea (No. 200), 2870 metres (7416 feet), summit without any name (No. 201), 3140 metres (10,302 feet), Passes Portillo (No. 202), 2600 metres (8530 feet), Puerta Nueva or Benites (No. 203), 2530 metres (8300 feet), Puerta Vieja (No. 204), 2790 metres (9154 feet), Valdez (No. 205), 2437 metres (7956 feet), Del Saco (No. 208), 2180 metres (7153 feet), Chañas (No. 209), 2250 metres (7383 feet), Mount Matancilla (No. 210), 2515

metres (8252 feet) Passes Piuquenes (No. 212), 2201 metres (7222 feet), Cerro Colorado (No. 213), 1970 metres (6464 feet), *Diucas Gap* (No. 216), 1950 metres (6398 feet), Cajon Negro (No. 218), 2190 metres (7186 feet), Pincheira (No. 220), 2105 metres (7007 feet), Laguna Epu Lauquen (No. 221), 2050 metres (6726 feet), Buraleo (No. 223), 1902 metres (5913 feet), *Pichachen Pass* (No. 228), 2018 metres (6621 feet), summit without any name, 2340 metres (7678 feet), *Copulhue Gap* (No. 230), 2073 metres (6802 feet), Mount Copulhue, 2500 metres (8203 feet), Mount Chanchoco (No. 232), 2679 metres (8790 feet), Copahuitos



THE MAIN CHAIN OF THE CORDILLERA IN THE CAJON OF
THE RIVER MAULE.

Pass (No. 233), 2018 metres (6621 feet), Mount Cochico, 2516 metres (8255 feet), Copahue Pass (No. 234), 1949 metres (6395 feet), and Copahue Volcano (No. 235), 2983 metres (9787 feet).

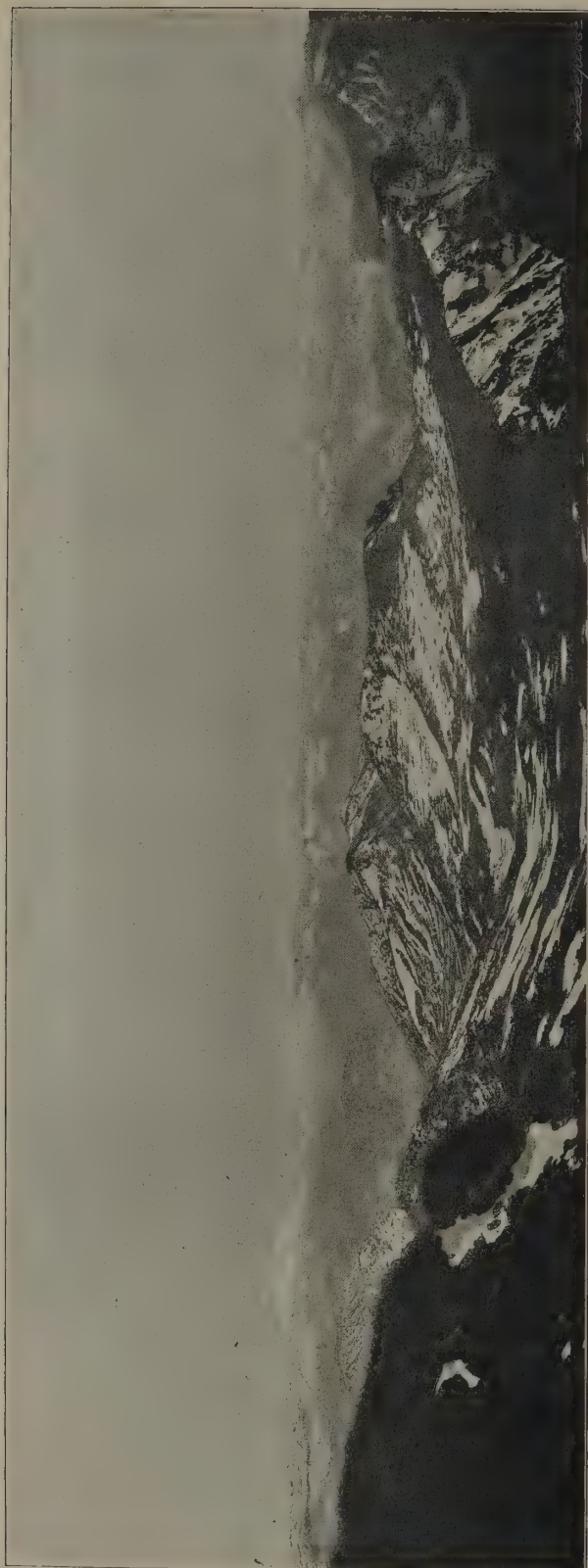
In preceding chapters have been stated the reasons which decided the Argentine Expert to carry the line to the south of Copahue Volcano, over the eastern ridge in the bifurcation of the Cordillera, accepting the corresponding points proposed by the Chilian Expert. This line includes the Passes of Puconmahuida (No. 236), Coliquen (No. 237), 1810 metres (5938 feet), Collochue (No. 238), Pulul (No. 239), Rahue (No. 240) Butahuso, 1649 metres (5111 feet),

Codihue (No. 241), 1990 metres (6529 feet), Pino Hachado (No. 242), 1820 metres (5971 feet), El Arco (No. 243), 1374 metres (4508 feet), Ycalma (No. 244), 1628 metres (5341 feet), up to the Pass of Santa Maria (No. 245), 1457 metres (4780 feet), which is comprised within the central chain or main range of the Andes, thus leaving the upper valley of the river Bio-Bio in territory belonging to the Republic of Chile. Plate XLVI., Fig. 2, contains a photographic panorama showing this bifurcation and the intermediary cutting of the Bio-Bio, and Plate XLVII. represents the Glacier of Mount Pulul in this same bifurcation.

The Argentine line continues, after Santa María Pass, 1457 metres (4780 feet), in the main chain by Mount Huechulepe, 1927 metres (6323 feet), Mount Laifu, 2032 metres (6667 feet), Quillahue Pass, 1490 metres (4889 feet), Mount Impodi, 2109 metres (6919 feet), Reigolil (No. 248), 1145 metres (3757 feet), Coloco Mount (Plate XLVIII.), 2044 metres (6707 feet), Coloco Pass (No. 250), 1095 metres (3593 feet), Mount Malalco, 1911 metres (6280 feet), Malalco Pass (No. 251), 1469 metres (4817 feet), Mount to the south, 1918 metres (6293 feet),



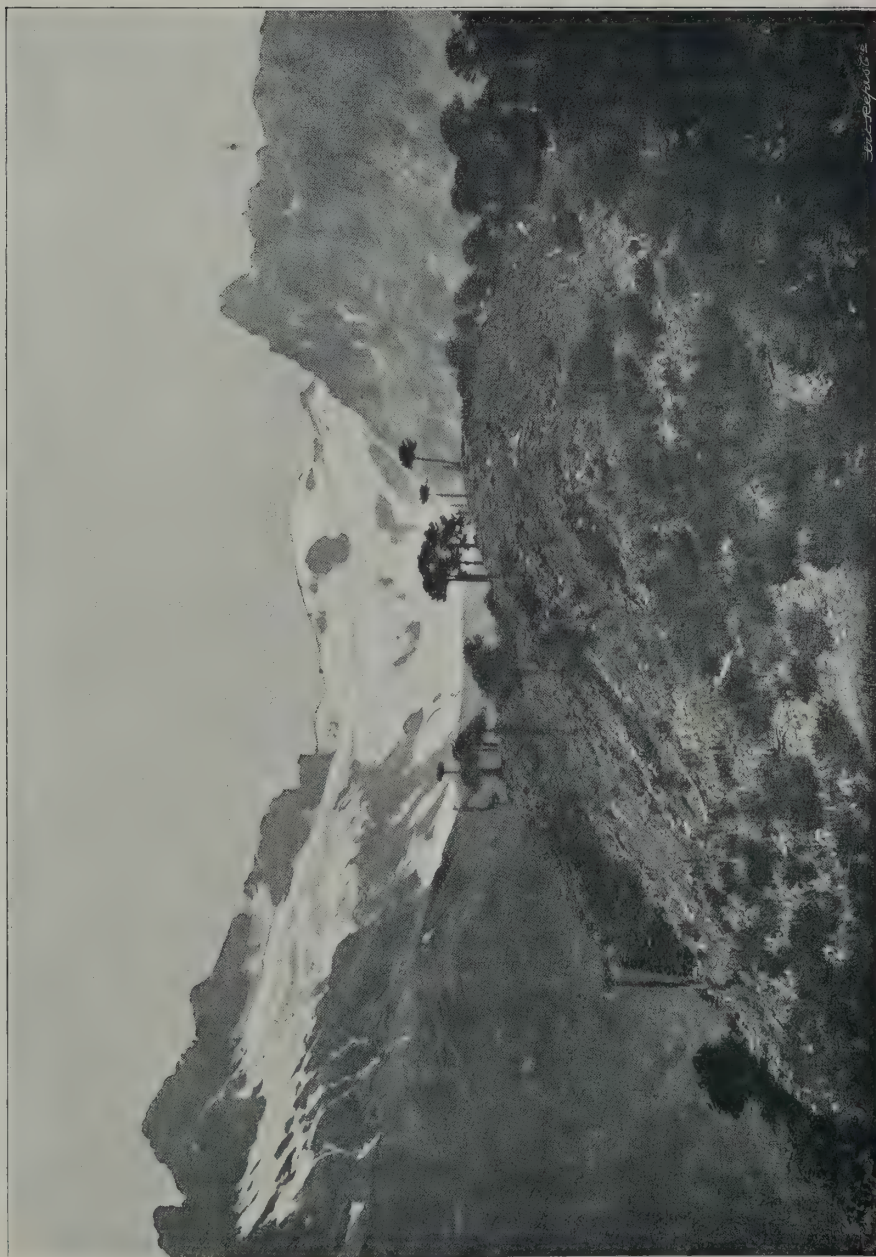
LAS DIUCAS GAP (1950 m.; 6398 f.).
Argentine landmark No. 216.

*Volcan Antuco.*

PICHACHEN PASS, IN THE MAIN CHAIN OF THE CORDILLERA DE LOS ANDES (2018 m.; 6621 f.).

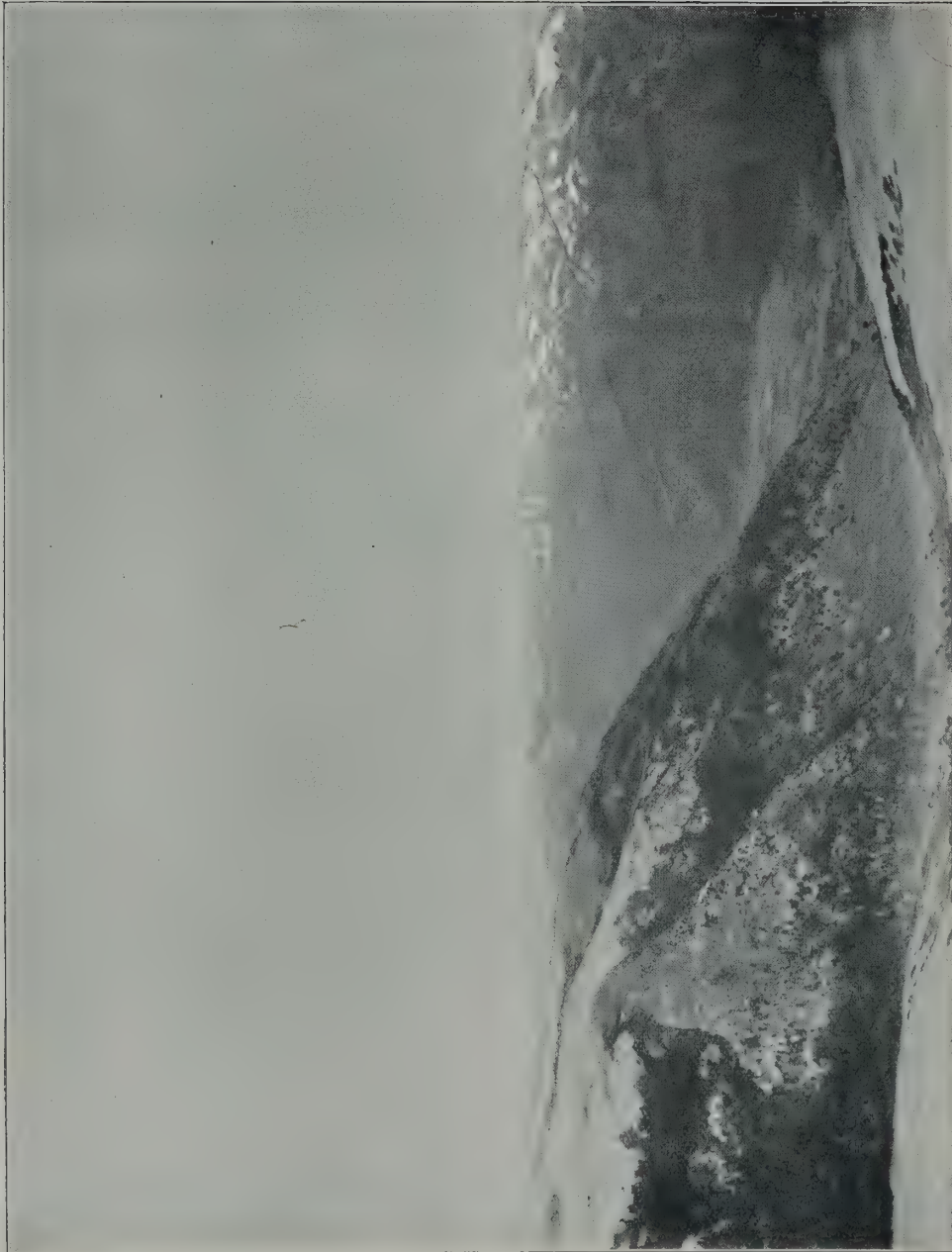
Argentine landmark No. 238.

Rilul I Pass (No. 252), 1129 metres (3705 feet), summit near the Pass, 1297 metres (4256 feet), Rilul II Pass (No. 253), 1208 metres (3964 feet), Mount Rasgado (No. 254), 1757 metres (5964 feet), Huirinlil Pass (No. 255), 1123 metres (3684 feet), summit in the line, 1549 metres (5083 feet), 1576 metres (5171 feet), Pass Añihue-raqui North, 1117 metres (3665 feet), Mount Añihuerahui (No. 257), 1754 metres (5755 feet), Pass Añihuerahui South (No. 257), 1366 metres (4482 feet), Mount Pocolpen, 2077 metres (6815 feet), Tromen Pass (No. 258), 1305 metres (4282 feet), Mamuil Malal Pass (No. 259), 1230 metres (4036 feet), Lanin Volcano (No. 260, Plate XLIX.), 3774 metres (12,383 feet), Paimun Pass (No. 261), 1450 metres (4889 feet), Quetru (No. 262), 1300 metres (4266 feet), Mount Paimun (No. 263), 1900 metres (6236 feet), Carirriño Pass (No. 264), 1090 metres (3577 feet), Nameless

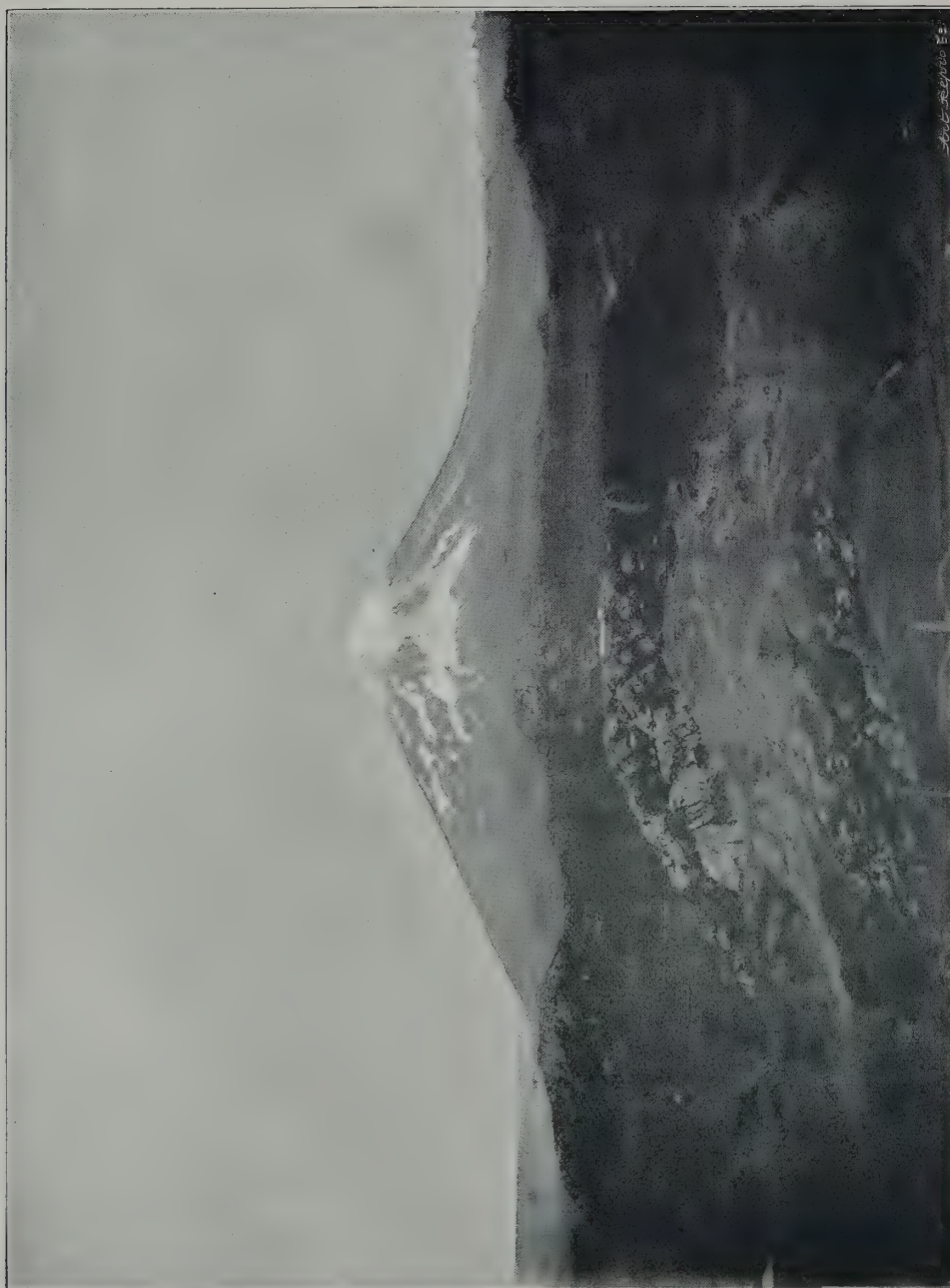


GLACIER OF MOUNT PULUL (2715 m. ; 8907 f.), IN THE BIFURCATION OF THE CORDILLERA.

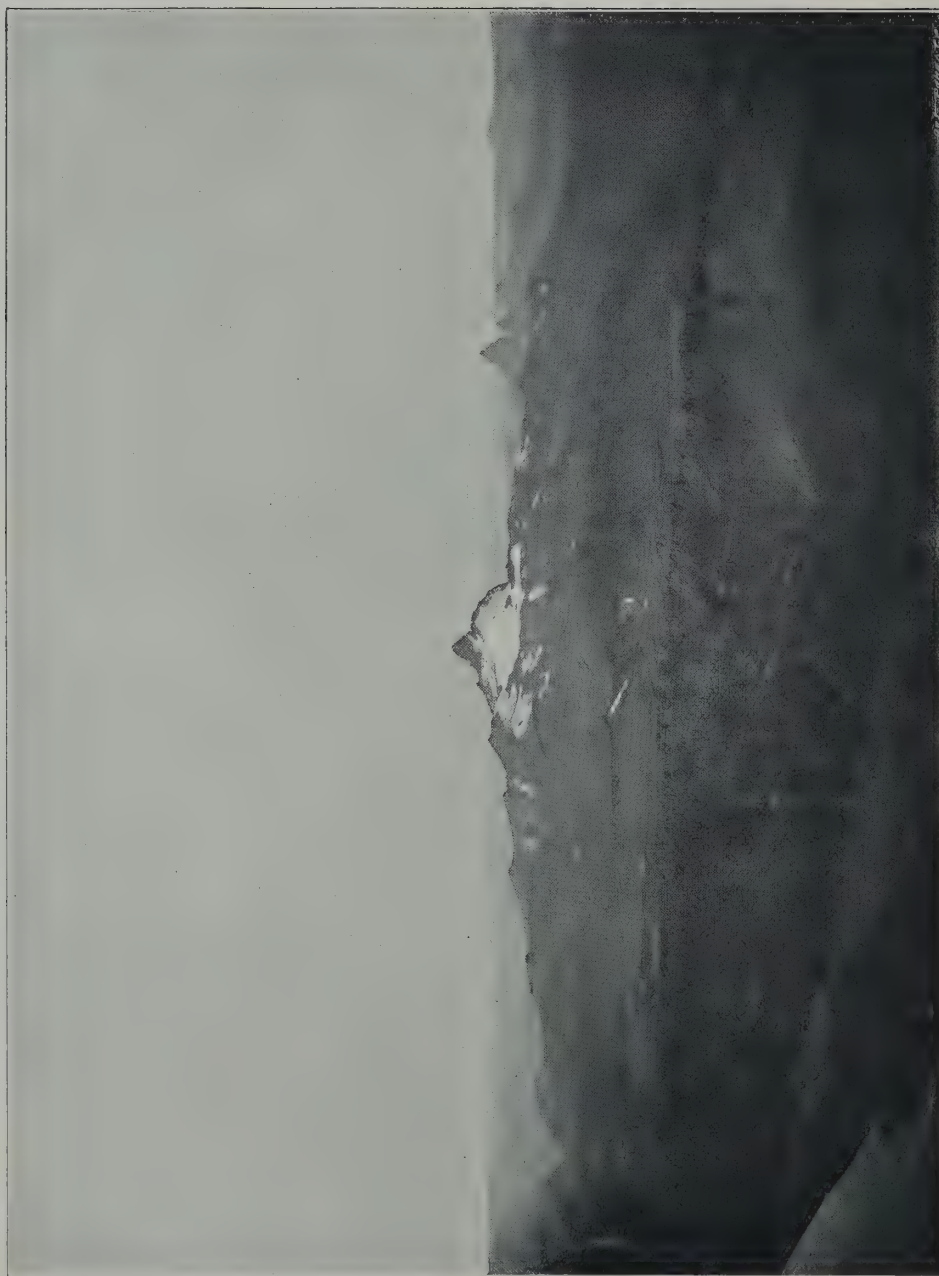
(From the sources of the Yumuyumu stream.)



MOUNT COLOCO (2044 m.; 6707 f.), FROM MOUNT URIBURU (2146 m.; 7041 f.).



VOLCANO LANIN (3774 m.; 12,383 f.) FROM THE WEST.
Argentine landmark No. 260.



MOUNTS QUINQUILLIL (2218 m.; 7277 f.) AND POCOLPEN (2077 m.; 6815 f.),
FROM THE WEST.

Mount (No. 265), 2170 metres (7120 feet), and Mount Perihueico (No. 266), 1740 metres (5709 feet). In the main chain of the Cordillera de los Andes are to be found other important peaks immediately adjoining the ridge which divides the waters of the said main chain, such as Trompodi, 2075 metres (6808 feet), Nompehuen, 2075 metres (6808 feet), Uriburu, 2146 metres (7041 feet), Rucachoroi, 2299 metres (7543 feet), Malalco, 2076 metres (6811 feet) to the east, and Zolepulli, 2137 metres (7012 feet), Quetropillan, 2372 metres (7782 feet), and Quinquilil (Plate L.), 2218 metres (7277 feet), to the west.



COPULHUE GAP (2073 m. ; 6802 f.).

Argentine landmark No. 230.

Along this extension of thirteen degrees of latitude the Argentine line coincides with the Chilian line, and was definitely accepted on October 1, 1898, by a Record drawn up at that date, in which the Chilian Expert recognised that that part of the boundary line was in the Cordillera de los Andes.

The illustrations which accompany this chapter render unnecessary any more explanations to justify the assertion of the Argentine Expert that the line accepted by the two Experts from Mount Tres Cruces to Mount Perihueico, in an extent about thirteen degrees of latitude, has been traced on the summit of

the Cordillera de los Andes, i. e. the Cordillera Nevada which always has been and will be the only rational boundary between Argentina and Chile. The common sense of the two peoples, from the very beginning of their existence, determined that boundary, taking into account its great height, its ruggedness, and its difficulty of access : it is a barrier impossible to disavow and dangerous to disregard, especially now, when it is more necessary in view of the political and economical development of both Nations.

4 vol + all

all 5 vol

